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# *MONTANA V. WYOMING*: AN OPPORTUNITY TO RIGHT THE COURSE FOR COALBED METHANE DEVELOPMENT AND PRIOR APPROPRIATION

*MICHELLE BRYAN MUDD*[*]

## I. INTRODUCTION

Across vast swathes of western lands, coalbed methane (CBM) wells dot the landscape, pumping out billions of gallons of groundwater to release natural gases trapped within subterranean coal seams.[1] These coal seams interlace complex networks of underground aquifers, many of which share a relationship with overlying surface waters. In Wyoming, Montana, and other western states, these CBM wells are developed largely outside of the traditional prior appropriation system, with little or no review of how water rights may be affected. These CBM wells are also developed under state laws that give little consideration to the

* Associate Professor and Director of the Land Use Clinic, University of Montana School of Law. I dedicate this Article to the peoples of Montana and Wyoming—two great states that I have had the opportunity to call home—whose hard work and love of place have inspired my own endeavors. My thanks to research assistants Nicholas Gochis and Andrew Gorder for their valuable assistance. This piece benefitted from the careful editing of my colleague Bari Burke and the insights of attorneys DarAnne Dunning and Jack Tuholske. My thanks as well to Bill Woessner, Professor of Geohydrology, for his guidance on matters of science.

[1] For technical background on CBM production, see NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES, MANAGEMENT AND EFFECTS OF COALBED METHANE PRODUCED WATER IN THE UNITED STATES 11–12, 19–24 (2010) [hereinafter COALBED METHANE PRODUCED WATER], *available at* www.nap.edu/catalog.php?record_id=12915; GARY BRYNER, COALBED METHANE DEVELOPMENT IN THE INTERMOUNTAIN WEST: PRIMER 5–7, 13–16 (July 2002) [hereinafter CBM PRIMER], *available at* www.colorado.edu/law/centers/nrlc/publications/CBM_Primer.pdf.

interstate nature of the affected waters.[2] Commentators have called for a more cohesive CBM regulatory regime that protects water rights users, and the law has experienced incremental changes. But change has been slow, and the present reality is that western states are enabling CBM development without a true understanding of how CBM groundwater withdrawals impact both underground and surface water supplies. With tremendous pressures to develop CBM as a principal fuel source,[3] and technical complexities that obscure our understanding of the CBM-water relationship, the problem appears intractable, yet deeply in need of reform.

Herein lies the significance of the current United States Supreme Court litigation between Montana and Wyoming.[4] The case centers upon the interstate waters of the Powder River Basin (the Basin), home to one of the largest and fastest developing CBM reserves in the nation.[5] The Basin, nestled within the Yellowstone River system, contains an estimated 18,000 CBM wells collectively pumping somewhere between 30 and 110 billion gallons of water each year, predominantly on the Wyoming side.[6] Among its several allegations in *Montana v. Wyoming*, Montana alleges that Wyoming's substantial CBM withdrawals are depleting surface waters that belong to Montana under the 1950 Yellowstone River Compact (the Compact).[7]

Some sixty years ago, when the Compact's negotiators were

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[2] *See* COALBED METHANE PRODUCED WATER, *supra* note 1, at 20 fig.2.1 (depicting several major coalbed methane basins that straddle state lines in Montana, Wyoming, Utah, Colorado, and New Mexico); *see also* CBM PRIMER, *supra* note 1, at 7–8 figs.5, 6.

[3] COALBED METHANE PRODUCED WATER, *supra* note 1, at 13 ("Natural gas has been described as a principal transition fuel to a less carbon-intensive U.S. energy portfolio."); CBM PRIMER, *supra* note 1, at 1 (describing CBM as "one of the most important and valuable natural resources" and "a central element of the national goal of a secure supply of energy"); *see also* CBM PRIMER, *supra* note 1, at 13 fig.9 (setting out CBM development revenues earned by state and local governments).

[4] *See* Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) (Opinion on Exception to Report of Special Master). All of the litigation documents referenced in this Article are located online at: www.supremecourt.gov/Search.aspx?FileName=/docketfiles/22o137.htm (U.S. Supreme Court docket) and www.stanford.edu/dept/law/mvn/ (Special Master docket).

[5] *See* COALBED METHANE PRODUCED WATER, *supra* note 1, at 15 fig.1.4; *see also* CBM PRIMER, *supra* note 1, at 1, 8. The Powder River Basin includes the Tongue and Powder Rivers.

[6] Estimates vary. *See* COALBED METHANE PRODUCED WATER, *supra* note 1, at 34 tbl.2.1 (citing a 30 billion gallon figure based on 2008 data provided by the State of Wyoming); *see also* CBM Primer, *supra* note 1, at 15 (supporting a 100 billion gallon figure based on estimates of average CBM well flows in the Basin being between 12–15 gallons per minute, which roughly translates to 17,000–21,000 gallons per day, multiplied over 18,000 wells). Additional monthly calculations on the Wyoming side are provided in note 74, *infra*.

[7] *See* Montana's Bill of Complaint ¶ 11, Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.). The official citation for the Compact is YELLOWSTONE RIVER COMPACT, Pub. L. No. 82-231, 65 Stat. 663 (1951) [hereinafter YELLOWSTONE RIVER COMPACT].

dividing the interstate waters of the Yellowstone River system, they had little inkling that CBM development would later transform the landscape of the Powder River Basin. Their focus was instead on the paramount importance of irrigated agriculture to the survival of the arid region. Arriving at what they believed to be an equitable division of waters, the States of Wyoming, Montana, and North Dakota expressly adopted the doctrine of prior appropriation to govern the uses of water under the Compact.[8] The *Montana v. Wyoming* litigation thus confronts the same issue with which the western states are grappling: Can CBM development regulations be made consistent with traditional prior appropriation principles?

The U.S. Supreme Court recently issued its first ruling in *Montana v. Wyoming*,[9] addressing the separate question of whether the prior appropriation doctrine accommodates Wyoming irrigators who upgrade their irrigation efficiencies and reduce historic return flows to Montana.[10] While the Supreme Court has not yet ruled on Montana's CBM claim, its appointed Special Master[11] Barton H. Thompson has issued some threshold legal conclusions. Importantly, he has concluded that groundwater withdrawals are within the scope of the Compact and that Wyoming would be in violation of the Compact if it is allowing CBM groundwater withdrawals to deplete surface waters belonging to Montana.[12] The Special Master's conclusions, which Wyoming chose not to appeal,[13] create significant repercussions for Wyoming CBM

[8] These Compact provisions are discussed in Part I.A, *infra*.

[9] *See* Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) (Opinion on Exception to Report of Special Master).

[10] For a discussion of this ruling, see the companion article, Lawrence J. MacDonnell, Montana v. Wyoming*: Sprinklers, Irrigation Water Use Efficiency, and the Doctrine of Recapture*, 5 GOLDEN GATE U. ENVTL. L.J. 265 (2012).

[11] *See* Order Appointing Barton H. Thompson, Esquire, of Stanford California, as Special Master, Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) [hereinafter Order Appointing Barton H. Thompson]. For a discussion of the role of Special Masters in original U.S. Supreme Court proceedings, *see generally* Anne-Marie C. Carstens, *Lurking in the Shadows of Judicial Process: Special Masters in the Supreme Court's Original Jurisdiction Cases*, 86 MINN. L. REV. 625 (2002).

[12] *See* First Interim Report of the Special Master at 89–90, Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) [hereinafter First Interim Report]. Because this conclusion was reached in ruling on Wyoming's Motion to Dismiss, the Special Master has decided only the legal question of whether such activities would constitute an actionable violation of the Compact. The question of whether actual violations are occurring may be resolved only after discovery and further fact finding proceedings in the case. *Id*.

[13] Because Wyoming did not challenge these conclusions by the Court's deadline for filing exceptions, it is assumed that the issue is finally resolved and has become the law of the case. As a procedural formality, however, the Court likely must still adopt the Special Master's conclusion. *See* Carstens, *supra* note 11, at 656 ("[W]hile the Special Master's reports and recommendations are advisory only, the Court usually enters the Master's recommendation as its order if neither of the

development, and arguably Montana CBM development as well. The Special Master will next consider whether Wyoming's CBM groundwater pumping is indeed depleting surface water supplies, and if so, what remedies are appropriate to address the Compact violations.[14] These remaining questions create an important opportunity to usher in regulatory changes that ensure CBM development does not undermine the Compact's division of waters—regulatory changes that may serve as a signpost for the other western states as well.

Part I of this Article provides a brief background on the Yellowstone River Compact and the *Montana v. Wyoming* litigation. This part further explains the Special Master's analysis of the CBM issue, as well as the Supreme Court's recent ruling on improved irrigation efficiency. When viewed together, these decisions provide an important framework for determining how the parties' regulation of CBM development should proceed. Part II then describes the magnitude of the CBM groundwater pumping issue and asserts that the posture of the *Montana v. Wyoming* case provides a unique opportunity not only to set Powder River Basin CBM development on the right course for Compact compliance, but also to more broadly right the course for how prior appropriation and CBM development work together in the western states. If this opportunity is not seized, there is great potential for harm to water users throughout the West, some of which may be irreversible and may not be redressed under current state laws. Focusing on the remedy aspect of the litigation, Part III then discusses the steps that the Special Master—or the parties in a settlement process—can take to design a comprehensive CBM regulatory process that upholds the principles of prior appropriation. These steps include invalidating those aspects of the States' current CBM regulations that fail to comply with the Compact and requiring new, science-based regulatory features that prospectively protect water rights users.

The Article concludes that the Yellowstone River Compact dispute, and like disputes throughout the West, cannot be fully resolved without a new regulatory process for CBM development that prospectively addresses harms to water rights. Ultimately, this interstate dispute provides a rare and critical lens for all prior appropriation states

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state parties file a formal objection.").

[14] While a possibility exists that the Special Master may ultimately find there is no surface water depletion from CBM groundwater pumping, the available hydrogeologic data suggests otherwise. *See* discussion in Parts II and III.B, *infra*. To the extent the evidence is inconclusive, this Article argues that the Special Master should order further studies and monitoring as part of the remedy in the case, taking a precautionary approach to avoid irreversible harms to the water supply. *See* discussion in Part III, *infra*.

grappling with how to adapt traditional appropriative rights principles to the emerging use of CBM development.

## II. TAKING GUIDANCE FROM THE U.S. SUPREME COURT AND SPECIAL MASTER RULINGS IN THE CASE

In 2007 the U.S. Supreme Court accepted original jurisdiction in *Montana v. Wyoming* to resolve allegations that Montana has made against Wyoming under the 1950 Yellowstone River Compact, an agreement that covers the interstate waters of the Powder River Basin, including the Tongue and Powder Rivers at issue in the litigation.[15] As is the tradition in interstate water disputes, the Supreme Court appointed a Special Master—in this case noted water law Professor Barton H. Thompson, Jr.—to hear evidence and make recommended rulings to the Supreme Court.[16]

Montana alleges that Wyoming is allowing several types of water uses, including CBM groundwater pumping,[17] that have resulted in the illegal taking of water belonging to Montana under the Compact.[18] To support its allegations, Montana points to data on the Tongue and Powder Rivers showing declines in the amount of water that has historically crossed into Montana.[19] While the Special Master has addressed several aspects of Montana's claims,[20] the Supreme Court has ruled on only one claim thus far—that Wyoming has illegally "allowed the consumption of water on existing irrigated acreage . . . to be increased" through the use of upgrades in irrigation efficiency, thereby

[15] Although the State of North Dakota is also a signatory of the Compact and is thus named in the litigation, Montana has not made claims against North Dakota. Montana's Brief in Support of Motion for Leave to File Bill of Complaint at 3, Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) [hereinafter Montana's Brief in Support]. The Powder River Basin, which contains the Powder and Tongue Rivers, is a subbasin nested within the Yellowstone River Basin. *See* Water Resources Division, Montana Department of Natural Resources and Conservation, Yellowstone River Basin Map, dnrc.mt.gov/wrd/water_mgmt/water_reservations/yellowstone_riv_basin/yrb_reliefmap.asp (last visited Mar. 12, 2012). For a fuller discussion of the background of the *Montana v. Wyoming* case and the Yellowstone River Compact, *see* Melosa Granda, *A Water Story With Original Jurisdiction, and a Doctrine for Changing Uses*, 5 GOLDEN GATE U. ENVTL. L.J. 257 (2012); s*ee also* First Interim Report, *supra* note 12, at 1–12.

[16] *See* Order Appointing Barton H. Thompson, *supra* note 11.

[17] Other allegations not addressed in this Article include the illegal expansion of irrigated acreage, illegal permitting of groundwater wells for irrigation and other uses, and illegal enlargement or new construction of water storage facilities. *See* Bill of Complaint, *supra* note 7, ¶¶ 9–11.

[18] *See generally* Bill of Complaint, *supra* note 7.

[19] *See generally* Joint Appendix 0317-0498, Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) (containing annual reports to the Yellowstone River Compact Commission that comparatively show a decline in water supply to Montana).

[20] *See generally* First Interim Report, *supra* note 12.

diminishing return flows available to Montana (the "improved irrigation efficiency" allegation).[21] In his First Interim Report, the Special Master concluded that Wyoming irrigators *can* upgrade their irrigation efficiency without violating the Compact, so long as they are using the conserved water to irrigate lands already under irrigation.[22] Montana filed an exception to this conclusion,[23] and the Supreme Court affirmed the Special Master in its Opinion on Exception to Report of Special Master.[24]

More favorably for Montana, the Special Master also concluded that the Compact, which is silent concerning groundwater, nonetheless covers groundwater hydrologically connected to surface water in the Basin; further, that Wyoming CBM groundwater pumping violates the Compact if it takes surface water away from Montana water users.[25] Wyoming did not file an exception to this conclusion, so the issue did not reach the Supreme Court for oral argument.[26] Remaining before the Special Master are questions of whether Wyoming's CBM development is depleting Montana's surface water supplies and, if so, what remedies are appropriate to address these violations.[27]

The Supreme Court's Opinion on Exception to Report of Special Master provides important guidance on how Wyoming's CBM groundwater withdrawals should be analyzed under the Compact. Notably, the Supreme Court has concluded that the Compact is subject to the doctrine of prior appropriation, as defined through a comparative analysis of the water laws of the western states. If a similar analysis is applied to the CBM groundwater issue, it is likely Wyoming's conduct will be found to violate the no-waste and no-injury rules of prior appropriation.

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[21] *See* Bill of Complaint, *supra* note 7, ¶ 12; *see also* Montana's Exception and Brief at 7–8, Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.); Montana v. Wyoming, 131 S. Ct. 1765, 1170 n.1 (2011) (No. 137, Orig.) (Opinion on Exception to Report of Special Master).

[22] *See* First Interim Report, *supra* note 12, at 86-88.

[23] *See* Montana's Exception and Brief, *supra* note 21, at 21–25.

[24] *See* Montana v. Wyoming, 131 S. Ct. 1765, 1769 (2011) (No. 137, Orig.) (Opinion on Exception to Report of Special Master).

[25] *See* First Interim Report, *supra* note 12, at 89–90.

[26] For a discussion on the likely procedural posture of this issue, *see supra* note 12.

[27] *See id*., at 2.

### A. THE SUPREME COURT'S CONCLUSION THAT THE LAWS OF PRIOR APPROPRIATION IMBUE THE COMPACT

The operative language of the Yellowstone River Compact begins in Article V(A):

> Appropriative rights to the beneficial uses of the water of the Yellowstone River System existing in each signatory State as of January 1, 1950, shall continue to be enjoyed in accordance with the laws governing the acquisition and use of water under the doctrine of appropriation.[28]

Article V(B) of the Compact then proceeds to describe how the States will apportion the unused and unappropriated waters after January 1, 1950, for either (1) supplemental water supplies on existing irrigated lands or (2) water storage or direct diversions for beneficial uses on new lands.[29] These supplemental appropriations are also "to be acquired and enjoyed in accordance with the laws governing the acquisition and use of water under the doctrine of appropriation."[30]

The Compact waters are thus divided between existing pre-1950 water rights and water uses developed after 1950. Whereas Montana's improved irrigation efficiency allegation targeted Wyoming's misuse of pre-1950 water rights, Montana's CBM groundwater pumping allegation targets Wyoming's misuse of water that was developed after the Compact was ratified. Nonetheless, as argued below, the Compact subjects both pre- and post-1950 waters to prior appropriation principles.[31]

The Compact also defines key terms used in Article V, including:

> Beneficial Use: "[T]hat use by which the water supply of a drainage basin is depleted when usefully employed by the activities of man."
>
> Divert and Diversion: "[T]he taking or removing of water from the Yellowstone River or any tributary thereof when the water so taken or removed is not returned directly into the channel of the Yellowstone River or of the tributary from which it is taken."
>
> Yellowstone River System: "[T]he Yellowstone River and all of its tributaries, including springs and swamps, from their sources to the

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[28] *See* YELLOWSTONE RIVER COMPACT, *supra* note 7.
[29] *Id.* art. V(B).
[30] *Id*.
[31] *See* discussion *infra* Part III.A.

> mouth of the Yellowstone River . . . ."
>
> Tributary: "[A]ny stream which in a natural state contributes to the flow of the Yellowstone River, including interstate tributaries and tributaries thereof . . . ."[32]

Also important is the Compact's statement that the parties intend to "provide for an equitable division and apportionment" of the waters in the Yellowstone River System and "to remove all causes of present and future controversy" concerning those waters.[33]

The Compact provisions between Montana and Wyoming are administered by the Yellowstone River Compact Commission (Compact Commission), comprised of one Montana representative, one Wyoming representative, and one representative from the federal government.[34] Although there is a dispute resolution process involving the Compact Commission, that body was unable to resolve the existing dispute between the States because it deadlocked in a 1:1 vote, with the U.S. representative abstaining.[35] This gridlock evidences the parties' inability to negotiate a settlement of their differences.

In its Opinion on Exception to Report of Special Master, the Supreme Court—in a 7:1 decision[36]—began with the general proposition that "[a]s with all contracts, we interpret the compact according to the intent of the parties, here the signatory States."[37] The Supreme Court then held that Article V(A) of the Compact directly incorporates the doctrine of prior appropriation.[38] Therefore, even though the parties are subject to the negotiated terms of the Compact, there are nonetheless common law water principles that will be read into the document. Next, the Supreme Court proceeded to consult case law from prior appropriation states and treatises summarizing appropriative rights principles.[39] This approach makes sense from the perspective of understanding what the intent of the signatory States was when they used

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[32] *See* YELLOWSTONE RIVER COMPACT, *supra* note 7, arts. II(D), (E), (G) and (H).

[33] *Id.* pmbl.

[34] *Id.* art. III.

[35] *See* Montana's Brief in Support, *supra* note 15, at 26-27 ("Montana brings its claims after many years of attempting to resolve fundamental differences with Wyoming on matters of Compact interpretation. In the absence of a resolution by agreement between the States, only this Court can resolve the dispute. . . . [T]he states are deadlocked over threshold legal questions regarding the proper interpretation of the Compact.").

[36] Justice Scalia dissented and Justice Kagan did not participate. Montana v. Wyoming, 131 S. Ct. 1765, 1779 (2011) (No. 137, Orig.) (Opinion on Exception to Report of Special Master).

[37] *Id.* at 1771–72 n.4.

[38] *Id.* at 1772.

[39] *Id.* at 1772–77.

the phrase "doctrine of appropriation."

There are, however, difficulties attendant with incorporating common law principles into a compact. Foremost among them is the reality that common law, including water law, is by its very nature an evolving universe of norms. It is not entirely clear whether the parties intended to incorporate the common law at the time of the Compact or the evolving principles of common law over time. The Supreme Court noted this dilemma in its Opinion on Exception to Report of Special Master:

> The States appear to have assumed that the doctrine has not changed in a way directly relevant here. We therefore do not decide whether Article V(A) intended to freeze appropriation law as it stood in 1949, or whether it incorporates the evolution of the doctrine over time, allowing Compact-protected rights to grow or shrink accordingly. We resolve the first exception without prejudice to that issue.[40]

For purposes of the first exception, then, the Supreme Court, like the Special Master before it, examined both pre- and post-1950 water law on the issue of improved irrigation efficiency.[41]

Also problematic is the question of *which* state's common law should govern. Although scholars can derive some common appropriative rights principles among the prior appropriation states,[42] the reality is that no two states apply those principles in precisely the same way. Because Montana and Wyoming are the litigating parties, the Supreme Court began by looking at the prior appropriation laws within Wyoming and Montana, and from there enlarged its inquiry to the broader universe of western states that follow prior appropriation.[43] The Supreme Court also noted instances when one appropriation state took a unique, and therefore unrepresentative, position on an issue.[44]

Finally, and perhaps most problematic, is the question of how to craft prior appropriation law for issues on which little or no law exists. This task places the Supreme Court in the difficult and reluctant position of determining what it believes the laws of the States to be in the absence

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[40] *Id.* at 1771–72 n.4.

[41] *Id.*

[42] There are nine states classified as pure appropriation states and another ten considered to espouse a hybrid of appropriation and riparian principles. *See* DAVID H. GETCHES, WATER LAW IN A NUTSHELL 5–8 (4th ed. 2009); *see also* JOSEPH L. SAX ET AL., LEGAL CONTROL OF WATER RESOURCES: CASE AND MATERIALS 12–13 fig.1-5 (4th ed. 2006). The Court focused its inquiry almost exclusively on the pure appropriation states.

[43] Montana v. Wyoming, 131 S. Ct. 1765, 1771–72 n.4 (2011).

[44] *Id.* at 1775 n.8.

of case law directly on point. Such was the case with the improved irrigation efficiency issue, of which the Supreme Court observed that "[t]he lack of clarity in this area of water law highlights the sensitive nature of our inquiry and counsels caution."[45] To resolve this dilemma, the Supreme Court limited its holding to the Compact alone and stated that its decision "is not intended to restrict the States' determination of their respective appropriation doctrines."[46]

Because there was no case on all fours, the Supreme Court looked to general trends in change-of-use rules and recapture rules to conclude that irrigation efficiency improvements "are within the original appropriative right of Wyoming's pre-1950 water users," even when return flows are diminished.[47] Particularly compelling to the Supreme Court was the lack of water law scholars who have reached an alternative opinion on the issue.[48]

As the Special Master has acknowledged, "[w]hether groundwater withdrawals in Wyoming can violate Article V(A) of the Compact is a more difficult question . . . ."[49] Coalbed methane development is a relatively recent phenomenon that hit the Powder River Basin in the late 1990s,[50] some four decades after the Compact was entered. Coalbed methane groundwater pumping is on such a scale and is sufficiently distinct from other forms of mining water use as to require an adaptation in traditional water law norms. To date, the appropriation states have largely avoided the question of how to bring CBM development into compliance with state water laws, opting instead to create loopholes and exemptions for CBM. In response, scholars have called for legal reforms that better protect traditional water rights users—focusing primarily on CBM's violations of the no-waste and no-injury rules in prior appropriation.[51] The Special Master has thus begun answering the

[45] *Id.* at 1773 n.5.

[46] *Id.* at 1773 n.5.

[47] *Id.* at 1776.

[48] *Id.* at 1777. In his dissent, Justice Scalia criticizes the majority's "none-too-confident" reading of the common law. *Id.* at 1779–80 (Scalia, J., dissenting).

[49] First Interim Report, *supra* note 12, at 43.

[50] ROMEO M. FLORES ET AL., U.S. DEPT. OF INTERIOR, U.S. GEOLOGICAL SURVEY, OPEN-FILE REPORT 01-126 at 2 (2001), *available at* pubs.usgs.gov/of/2001/ofr-01-126/OF01-126.pdf.

[51] While the articles on point are numerous, some recent representative pieces include Colby Barrett, *Fitting a Square Peg in a Round (Drill) Hole: The Evolving Legal Treatment of Coalbed Methane-Produced Water in the Intermountain West*, 38 ENVTL. L. REP. NEWS & ANALYSIS 10,661 (2008); Gary Bryner, *Coalbed Methane Development in the Intermountain West: Producing Energy and Protecting Water*, 4 WYO. L. REV. 541 (2004); Cody Doig, Case Note, *Vance v. Wolfe: "Beneficial Use" or "Beneficial Byproduct"?—An Analysis of Produced Water in Colorado*, 13 U. DENV. WATER L. REV. 163 (2009); Arlene J. Kwasniak, *Waste Not Want Not: A Comparative Analysis and Critique of Legal Rights to Use and Re-Use Produced Water—Lessons for Alberta*, 10

difficult CBM questions by drawing on the parties' stated intent in the Compact, as well as developing legal norms and scholarship in western water law.

### B. THE SPECIAL MASTER'S INCLUSION OF GROUNDWATER IN THE COMPACT

As a threshold matter, Wyoming argued that the Compact does not cover groundwater, but rather is limited to the surface waters in the Yellowstone River Basin.[52] Its argument hinged on the absence of any mention of groundwater in the Compact's definitions of "Yellowstone River System" and "Tributary" (set out above). Under Wyoming's reasoning, its water users would be allowed to pump whatever amounts of groundwater they wished, even if that pumping depletes surface water supplies in the Basin. Resolving this legal question in Montana's favor, the Special Master concluded that the Compact includes groundwater that is hydrologically connected to surface waters in the Basin. Among the highlights of the Special Master's analysis are the following:

> *Evidence of the Parties' Intent*. The Special Master noted the Compact's statement that pre-1950 water rights "shall continue to be enjoyed." Since new groundwater withdrawals could "directly interfere with the continued enjoyment of pre-1950 surface rights in Montana," the parties must have intended the Compact to be read broadly enough to cover hydrologically connected groundwaters.[53]

Other important statements of intent are the Compact's twin goals to "remove all causes of present and future controversy . . . with respect to the waters of the Yellowstone River and its tributaries" and to "provide for an equitable division and apportionment of such waters."[54] Quoting language from a Special Master's Report in a prior compact case, the Special Master concluded that:

> Given the purposes of the Compact, "neither the parties to the Compact, nor the Congress and the President who approved it, could have intended that an upstream State could, with impunity, unilaterally enlarge its allocation by taking some of the virgin water supply before

U. DENV. WATER L. REV. 357 (2007); Anne MacKinnon & Kate Fox, *Demanding Beneficial Use: Opportunities and Obligations for Wyoming Regulators in Coalbed Methane*, 6 WYO. L. REV. 369 (2006).

[52] Wyoming's Motion to Dismiss at 59, Montana v. Wyoming, No. 137, Orig. (Apr. 1, 2008).

[53] *See* First Interim Report, *supra* note 12, at 11, 44–45.

[54] YELLOWSTONE RIVER COMPACT, *supra* note 7, pmbl., art. V(A).

it reached the stream flow."[55]

*Evidence of Appropriation Law at the Time of Compact*. The parties' intent to include hydrologically connected groundwater is corroborated by the science and the state of water law at the time of compacting. The Special Master observed that for "decades prior" the appropriation doctrine recognized that groundwater directly connected with a stream must be jointly managed with the surface waters to ensure priority of water rights.[56] Treatises, state court decisions, scientific journals, and prior compact decisions by the Supreme Court support this principle of connectivity.[57]

*Evidence of Appropriation Law Post-Compact.* The Special Master also observed the post-Compact developments in groundwater law, noting that both Montana and Wyoming have since placed groundwater within their respective permitting systems, subjecting the waters to prior appropriation principles.[58] Based on all of these evidentiary sources, the Special Master ultimately concluded that Basin groundwater diverted out of priority with hydrologically connected senior surface water rights would violate the Compact.[59]

The Special Master reserved for future decision the issue of "exactly what groundwater is covered" and "the question of the exact circumstances under which groundwater pumping violates Article V(A)."[60] These questions will necessarily involve discovery and evidentiary proceedings. Further, questions remain as to whether the Special Master's conclusions on CBM groundwater use will be extended to include post-1950 water rights under Article V(B).[61] Finally, the Special Master has yet to recommend the type of remedy that would

[55] First Interim Report, *supra* note 12, at 53 (citing First Report of the Special Master, Kansas v. Nebraska, No. 126, Orig., at 21 (Jan. 28, 2000)).

[56] *See id*., at 45.

[57] *See generally id.* at 45–50.

[58] *Id*. at 50–52.

[59] *Id.*

[60] *Id*. at 54, 90.

[61] At this stage in the proceeding, the Special Master has reached a conclusion only as to claims under Article V(A). *Id*. at 93 (addressing Montana's Motion for Summary Judgment on the question of whether the Compact applies to all tributaries of the Tongue and Powder Rivers). Therefore, there is a lingering question about whether the same analysis would apply to diversions and storage of waters affecting post-1950 water rights. On December 20, 2011, the Special Master held that although Montana's Bill of Complaint is broad enough to cover post-1950 claims, it must seek leave to amend its Complaint to more clearly articulate those claims under the Compact. *See generally* Memorandum Opinion of the Special Master on Montana's Claims Under Article V(B), Montana v. Wyoming, 131 S. Ct. 1765 (2011) (No. 137, Orig.) [hereinafter Opinion on Article V(B) Claims].

redress injuries and prospectively ensure that CBM groundwater withdrawals do not take waters belonging to water users under the Compact.

Viewing the Supreme Court's ruling and the Special Master's conclusions together, a framework emerges for how to resolve the remaining CBM issues in the case. As argued in Part III, the Special Master should include post-1950 water rights in his recommendations to ensure a complete resolution of the CBM controversy between the States. The Special Master should also note where Wyoming's CBM regulations fail to follow prior appropriation principles and jeopardize the continued enjoyment of water rights protected by the Compact. Noting the deficiencies in Montana's CBM regulations is important as well because Montana water users should be equally protected from CBM groundwater depletions on the Montana side of the Basin.[62] Finally, the Special Master should require a science-informed analysis of injury to water users, along with ongoing monitoring and management, as part of the CBM well permitting process in both States.

These recommended steps are important for several reasons. Foremost, leaving these issues unresolved will lead to the inevitable return of the parties to the U.S. Supreme Court for further lengthy proceedings. Coalbed methane development is occurring at a breathtaking pace and there is no evidence that the States, on their own, will legislatively address the deficiencies in their CBM regulations. Nor do the parties' recent breakdowns in negotiations provide assurance of a compromised settlement. Additionally, because of the sheer magnitude of groundwater pumping involved, time is of the essence. The longer the States turn a blind eye to the harms caused by CBM development, the greater the risk that water users will be injured and that irreversible depletions will occur to the Basin's water resources. Finally, by addressing how CBM groundwater production fits within the prior appropriation systems of Montana and Wyoming, the Special Master and the parties are in the unique position of creating a successful process that other western states can emulate. At present, the law is in a state of transition in the appropriation states and there is often dissension among the legislative, agency, and judicial forces brought to bear on the question. Thus, the interstate conflict between Montana and Wyoming presents a unique opportunity to reform a broken system, and this opportunity should be seized.

[62] If Montana were held to a different standard than Wyoming, it would also open the door for Wyoming to argue that depletions on the Montana side of the Basin may be due in part to Montana-permitted CBM wells.

## III. SEIZING A RARE OPPORTUNITY BEFORE IT IS TOO LATE

Rarely does a water law question that is confounding several states land squarely before the U.S. Supreme Court in the context of an interstate waters dispute. While it is admittedly not the Supreme Court's responsibility to solve the legal paradoxes of state water law, the western states may nonetheless be secondary beneficiaries of the conclusions and solutions that emerge from the *Montana v. Wyoming* CBM dispute. Further, there are several major CBM basins that straddle state lines in the West, suggesting the likelihood of future interstate waters disputes that raise similar issues to those in *Montana v. Wyoming*.[63] Because of the unique role of the Special Master,[64] the western states can benefit from both an expert synthesis of this water law issue and an expert recommendation on how to resolve the issue through regulatory and management regimes. At the very least, these states should pay careful attention not only to the Special Master's rulings on the question, but also to the on-the-ground successes and failures that will ensue as Wyoming and Montana attempt to comply with those rulings.

Thus, although it is customary for courts to address legal questions on their narrowest grounds, a broader approach is warranted in the case of *Montana v. Wyoming*. For example, while a decisionmaker may be inclined to resolve the more limited question of how CBM development may harm pre-1950 water rights, the hydrogeologic reality suggests that post-1950 water rights would also be impacted and should therefore be considered as part of a single water resource. Further, a decisionmaker may be inclined to simply rule that Wyoming cease withdrawing groundwater in violation of the Compact, leaving it to the States to work out the specifics of that ruling. But the stalemate between Montana and Wyoming, combined with a general recalcitrance among the western

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[63] *See* COALBED METHANE PRODUCED WATER, *supra* note 1, at 20 fig.2.1 (depicting several major coalbed methane basins that straddle state lines in Montana, Wyoming, Utah, Colorado, and New Mexico); *see also* CBM PRIMER, *supra* note 1, at 7–8 figs.5, 6.

[64] Carstens makes the following observations about the Special Master process:

> The appointment of a Special Master may be initiated either on motion, which the Court may refuse to grant, or at the Court's own prerogative. After appointing a Special Master, the Court provides little supervision of the master's proceedings. Even as a preliminary matter, no rule governing Supreme Court practice expressly provides for the appointment of Special Masters, as contrasted with the appointment mechanism for special masters in the lower federal courts set forth in Rule 53 of the Federal Rules of Civil Procedure. . . .
>
> Practice and time have shown that the Court generally adopts the Special Masters' reports, even when those reports make conclusions of law in addition to resolving issues of fact.

Carstens, *supra* note 11, at 653, 655–56 (footnote omitted).

states to regulate CBM development, suggests that a more directed and guided court remedy is warranted—a remedy that requires comprehensively managing connected surface and groundwaters in the Basin.[65]

Absent a broader resolution of the CBM issue, it is highly likely that the litigants will return to the Supreme Court to seek resolution of these questions in the future. Additionally, private parties affected by CBM development may commence federal litigation against the States and the Compact Commission for failing to fully perform the terms of the Compact.[66] In other words, it is a wise use of judicial resources to address these questions while the litigation is before the Supreme Court.

Aside from the likelihood of additional litigation, there is an even greater hydrological risk that comes with allowing further time to lapse before CBM groundwater withdrawals are comprehensively addressed. As John Leshy noted in his seminal work on interstate groundwater resources:

> [S]ome aquifers are "recharged," or replenished, very slowly or not at all, and artificial recharge may not be possible. Pumping water from these aquifers may amount to mining a non-renewable resource . . . . [M]uch groundwater is connected hydrologically to surface waters; in fact, the U.S. Geological Survey now estimates that groundwater is the source of almost 40 percent of the streamflow in the entire country. As groundwater extraction increases, surface streams may dwindle or disappear, and rights to use water from those streams may go unsatisfied, even though typically they were established first. . . .
>
> Confined to pore spaces in geological beds, groundwater tends to move much more slowly than surface water. As a result, the impact of withdrawals from a well . . . on the flows of watercourses on the surface[] may not be perceived for months, years, or even decades. . . .
>
> [T]he more we learn about groundwater, the more we learn it is connected to surface watercourses, which themselves often cross state lines. . . . Moreover, it seems the more we learn about the subsurface,

[65] To the extent that the States show a fresh interest in negotiating a settlement regarding CBM water use, the Court's guidance is equally helpful in that situation.

[66] YELLOWSTONE RIVER COMPACT, *supra* note 7, art. III. This article creates the Commission and charges it with "carry[ing] out the provisions of this Compact." This article also authorizes the Commission to be sued in its official capacity. For an example of a private action under the Compact, see *Intake Water Co. v. Yellowstone River Compact Comm'n*, 590 F. Supp. 293, 294 (D. Mont. 1983) (recognizing federal subject matter jurisdiction over a private water development company's suit to challenge Article X of the Compact relating to restrictions on out-of-basin transfers).

> the more likely we may find that seemingly isolated local aquifers connect to other aquifers that have connections across state lines through groundwater or surface water. . . .
>
> Where groundwater extraction (in general, and perhaps especially where interstate groundwater extraction) is involved, if it turns out the impact is significant, by the time this fact becomes known, mitigating it may be difficult, if not impossible.[67]

These words apply directly to the Yellowstone River Basin, in which the U.S. Geological Survey has documented vast underground aquifers that extend beneath both Wyoming and Montana.[68] A significant portion of these aquifers is part of the greater Northern Great Plains aquifer system. The groundwater in these aquifers, as the surface waters above, flows in a north and northeasterly direction from Wyoming into Montana, where much of the water is used for domestic and irrigation supply.[69] Further, the studies reflect a high level of groundwater and surface water connectivity, with surface waters influencing aquifer formations and groundwater discharging to surface waters in places throughout the Yellowstone River Basin. The studies also reflect complex and yet-to-be-understood relationships among the various aquifers, which are both confined and unconfined, and found at various depths below the ground surface. The risks of diminished water supply and dewatering are imminent and real.[70]

This data only scratches the surface of information that might be developed for the Powder River Basin. But one thing is clear: CBM resources crisscross the very same strata in which this complex system of groundwater aquifers resides, and CBM groundwater pumping is occurring at an unprecedented rate.[71] Coalbed methane wells in the Basin

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[67] John D. Leshy, *Interstate Groundwater Resources: The Federal Role*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1475, 1477, 1479, 1481, 1497 (2008) (footnote omitted); s*ee also* Lawrence J. MacDonnell, *Integrating Use of Ground and Surface Water in Wyoming*, 47 IDAHO L. REV. 51, 62 (2010) ("It is widely acknowledged that, sooner or later, most ground water uses will reduce water available in surface water sources. It is really only a matter of when and how much." (footnote omitted)).

[68] *See* RONALD B. ZELT ET AL., U.S. DEPT. OF INTERIOR, U.S. GEOLOGICAL SURVEY, ENVIRONMENTAL SETTING OF THE YELLOWSTONE RIVER BASIN, MONTANA, NORTH DAKOTA, AND WYOMING 52–55 & fig.16 (1999), *available at* pubs.usgs.gov/wri/wri984269/wri984269.pdf.

[69] *See* R. L. WHITEHEAD, U.S. DEPT. OF INTERIOR, U.S. GEOLOGICAL SURVEY, GROUND WATER ATLAS OF THE UNITED STATES: MONTANA, NORTH DAKOTA, SOUTH DAKOTA, WYOMING, The Northern Great Plains Aquifer System & fig.50 (1996), *available at* pubs.usgs.gov/ha/ha730/ch_i/I-text2.html.

[70] *See* CBM PRIMER, *supra* note 1, at 14.

[71] *See* ZELT ET AL., *supra* note 68, at 21–22 (identifying strata later discussed as housing aquifer systems).

pump at a higher daily volume than any other major CBM basin.[72] An animated map produced by the Wyoming State Geological Survey (WSGS) shows that by 2007 CBM water production had reached 2.5 billion gallons per month on the Wyoming side of the Basin[73]—a figure that may be conservative based on other estimates of nine billion gallons per month.[74] Even under more conservative figures, one month of CBM groundwater pumping consumes a water quantity that would serve the entire City of Sheridan, Wyoming, for over three years.[75] Further, Wyoming estimates that the CBM industry has the capacity to install wells at the rate of 100 per week, with approximately 30,000 wells forecasted to be running today and 50,000-100,000 wells at full build-out.[76] The Wyoming Coal Bed Natural Gas Water Management Task Force estimates that from 2006 to 2029, cumulative CBM water production in the Basin will reach 11.6 billion barrels (or 487.2 billion gallons).[77]

Wyoming's CBM literature acknowledges a lack of understanding about aquifer recharge and the reality that "it may take hundreds of years to fully recharge" the withdrawn waters.[78] The U.S. Department of Interior similarly estimates aquifer drawdowns of several hundred feet in some areas of the Basin, with a full aquifer recovery that would extend "over the next hundred years"[79] —"not happening within the lifetimes of any of the state's residents."[80] By that time the CBM well, which has a seven-to-ten-year life span, will have long been abandoned and the

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[72] *See* CBM PRIMER, *supra* note 1, at 14 tbl.2.

[73] Wyoming State Geological Survey, Powder River Basin Animation, www.wsgs.uwyo.edu/GIS_and_online_maps/Animations/PRB.aspx (last visited Mar. 12, 2012). The animation presents the unit of measurement as a BBL or barrel. One barrel equals approximately forty-two gallons of water. COALBED METHANE PRODUCED WATER, *supra* note 1, at 36 n.5.

[74] *See supra* note 6 (discussing range of figures available in the CBM literature).

[75] POWDER/TONGUE RIVER BASIN WATER PLAN TECHNICAL MEMORANDA, HKM Engineering, Inc. (Feb. 2002), *available at* waterplan.state.wy.us/plan/powder/techmemos/muniuse.html (noting Sheridan's annual use of 689.72 million gallons of water).

[76] *See* RODNEY H. De BRUIN ET AL., WYOMING STATE GEOLOGICAL SURVEY, COALBED METHANE IN WYOMING, INFORMATION PAMPHLET 7, at 20 (2d ed. 2004), *available at* www.wsgs.uwyo.edu/docs/coalbed.pdf; CBM PRIMER, *supra* note 1, at 11 & fig.8.

[77] WYOMING COAL BED NATURAL GAS WATER MANAGEMENT TASK FORCE INTERIM REPORT 6 (Dec. 14, 2006) (on file with author).

[78] *See* DE BRUIN ET AL., *supra* note 76, at 19–20.

[79] *See* BUREAU OF LAND MGMT., U.S. DEP'T OF INTERIOR, WYOMING POWDER RIVER BASIN FINAL ENVIRONMENTAL IMPACT STATEMENT xxxi, 4–38 (Jan. 2003), *available at* www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/prb-feis/vol_1.Par.67414.File.dat/front3.pdf.

[80] BUREAU OF LAND MGMT., U.S. DEP'T OF INTERIOR, MONTANA STATEWIDE DRAFT OIL AND GAS ENVIRONMENTAL IMPACT STATEMENT 4–37 (Jan. 2002), *available at* bogc.dnrc.mt.gov/webmapper_cbm_info_res.asp.

producer will have moved on.[81]

Another sobering reality is that we cannot find solace in either Montana's or Wyoming's water permitting systems. Both States, like other appropriative rights states dealing with CBM development, are widely criticized for their handling of CBM.[82] Most notably, both States allow pumping without preliminary inquiry into the harm to existing water rights holders.[83] Both also allow the massive wasting of pumped groundwater via discharges or storage in evaporation holding ponds.[84] And while Montana law does provide for some compensation to injured well owners, surface water owners are not compensated, and the burden of proof is on the injured water user to prove causation[85]—no small task in light of the hydrogeologic complexities discussed above. In this regard, Montana's allegations against Wyoming's CBM development ring slightly disingenuous because Montana is perpetrating similar harms against its own water rights holders. This of course does not excuse Wyoming's violations of the Compact. Nor should it alter the outcome of the case. But it does suggest that reforms on Montana's part are also necessary. Indeed, careful management on the Montana side will be important to ensure that its water users receive the Compact benefits that Montana negotiated for them back in 1950.

In the not-so-distant past, states handled groundwater

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[81] *See* CBM PRIMER, *supra* note 1, at 7.

[82] *See generally* Barrett, *supra* note 51; *see* Robert E. Beck, *Current Water Issues in Oil and Gas Development and Production: Will Water Control What Energy We Have?*, 49 WASHBURN L.J. 423 (2010); *see also* Samantha Bohrman, *Groundwater Conservation and Coalbed Methane Development in the Powder River Basin*, 24 LAW & INEQ. 181 (2006); Bryner, *supra* note 51; MacKinnon & Fox, *supra* note 51; James Murphy, *Slowing the Onslaught and Forecasting Hope for Change: Litigation Efforts Concerning the Environmental Impacts of Coalbed Methane Development in the Powder River Basin*, 24 PACE ENVTL. L. REV. 399 (2007); Neal Joseph Valorz, Comment, *The Need for Codification of Wyoming's Coal Bed Methane Produced Groundwater Laws*, 10 WYO. L. REV. 115 (2010).

[83] *See* MONT. CODE ANN. § 85-2-510 (Westlaw 2011) (placing CBM permitting under the jurisdiction of the Montana Board of Oil & Gas and outside of the water rights permitting process that examines injury under Mont. Code Ann. § 85-2-311); *see also* WYO. STAT. ANN. § 41-3-931 (Westlaw 2011), generally requiring that applications "be granted as a matter of course." Wyoming scholars note that the state engineer does not as a matter of practice evaluate harm to existing water users before permitting a new groundwater well. *See* MacDonnell, *supra* note 67, at 53 n.20; *see also* Lawrence J. Wolfe & Jennifer G. Hager, *Wyoming's Groundwater Laws: Quantity and Quality Regulation*, 24 LAND & WATER L. REV. 39, 48, 62–64 (1989) (describing a process whereby senior appropriators object to interference by junior users *after* the juniors have obtained a permit).

[84] *See* MONT. CODE ANN. § 85-2-505(1) (Westlaw 2011) (prohibiting waste of groundwater but specifically exempting the "management, discharge, or reinjection of ground water produced in association with a coalbed methane well" from the definition of waste); *see also* Revised Interim Policy Memo from Patrick T. Tyrrell, State Engineer, to Wyoming State Engineer's Office at 4–5 (Apr. 26, 2004) (allowing produced groundwater to be disposed of via evaporation, infiltration, or discharge into reservoirs or leach fields) (on file with author).

[85] *See* MONT. CODE ANN. § 82-11-175 (Westlaw 2011).

complexities by simply ignoring groundwater issues until they reached crisis proportions.[86] We can no longer afford that approach. If a comprehensive, proactive remedy is not prescribed in the *Montana v. Wyoming* litigation, the odds of significant, perhaps irreversible, damage appear high. While the task of fashioning that remedy is daunting, it will be exponentially harder if we wait until some distant date in the future to unravel the consequences of the CBM development that is spreading rapidly across the face of the Powder River Basin landscape.

## IV. MOVING TOWARDS A MEANINGFUL REMEDY FOR WATER RIGHTS USERS

In its Complaint, Montana requests that Wyoming pay monetary damages for the wrongful water depletions it has caused. Montana also asks the U.S. Supreme Court to prospectively "command[] the State of Wyoming in the future to deliver the waters of the Tongue and Powder Rivers in accordance with the provisions of the Yellowstone River Compact" and to grant such "other relief as the Court deems just and proper."[87] The Supreme Court may provide such prospective remedies to avoid further breaches of the Compact.[88]

At this juncture, it is important to note that the Special Master has yet to hear evidence and make findings about the extent to which CBM groundwater withdrawals are connected to and depleting surface waters covered by the Compact.[89] In that sense the logical leap to remedies may appear premature. There are two important reasons why it is not. First, the existing, albeit incomplete, geohydrologic studies of the Basin indicate a high likelihood of connectivity and injury throughout the Basin.[90] To the extent that any particular CBM well is shown to be unconnected to surface waters, that is no guarantee that other, future wells will also be unconnected. There is thus an ongoing risk of future injury that can only be addressed through prospective Compact remedies. Second, the magnitude of the risk, and its potentially irreversible and long-term nature,[91] warrant an abundance of caution—essentially the exercise of a precautionary remedy—until the States have more fully and

[86] Leshy, *supra* note 67, at 1492 (discussing how the complication and cost of groundwater management is a major reason that state governments "have put off grappling with the challenge until a true crisis looms").

[87] Bill of Complaint, *supra* note 7, at 5.

[88] *See* Texas v. New Mexico, 482 U.S. 554, 568 (1983).

[89] *See supra* note 14 and related discussion.

[90] *See* discussion *supra* Parts II and III.B.

[91] *See* discussion *supra* Parts II and III.B.

accurately studied the impacts of CBM production on the Basin's surface water supply.[92]

As the Special Master determines the appropriate remedies in *Montana v. Wyoming*, there are three principal steps he can take to set Montana and Wyoming CBM development on a better course toward Compact compliance. First, the Special Master should extend his groundwater ruling to post-1950 water rights so that those rights are also protected from CBM groundwater withdrawals. Only by addressing the full spectrum of Compact water rights will the States be in a position to cohesively regulate CBM groundwater pumping in the Basin. Second, because the Compact expressly adopts the principles of prior appropriation, the Special Master should identify the ways in which the States' existing CBM regulations violate those principles. Third, the Special Master should require that groundwater modeling, data collection, and reporting occur in the Basin to ensure through sound science that CBM development is not injuring Compact water rights. Ultimately, these steps may also help guide the greater community of prior appropriation states grappling with CBM groundwater use.

### A. AN ADEQUATE REMEDY REQUIRES THAT THE SPECIAL MASTER'S CONCLUSION ABOUT GROUNDWATER BE EXTENDED TO POST-1950 RIGHTS UNDER THE COMPACT

The Special Master has already concluded that Wyoming CBM groundwater pumping violates the Compact if it depletes surface waters allocated to Montana's pre-1950 water rights users.[93] Montana's Complaint broadly asserts that Wyoming's CBM groundwater withdrawals constitute a "violation of Montana's rights under Article V of the Compact," which covers post-1950 rights as well.[94] Although the Special Master originally reserved all questions about post-1950 water rights,[95] he subsequently held that Montana must seek leave to amend its Complaint to more particularly describe its post-1950 claims.[96] This leave should be granted so that the Special Master and the U.S. Supreme Court can holistically address the impact of CBM groundwater production on Compact water rights. Indeed, the question is important enough that the parties should stipulate to allowing the Special Master to consider all Compact water rights when fashioning a remedy relating to

[92] Such a precautionary approach is described further in Part III.C, *infra*.

[93] *See* First Interim Report, *supra* note 12, at 89-90.

[94] *See* discussion *supra* Part I.A; Bill of Complaint, *supra* note 7, ¶ 11.

[95] First Interim Report, *supra* note 12, at 93.

[96] *See generally* Opinion on Article V(B) Claims, *supra* note 61.

CBM groundwater withdrawals. Ignoring post-1950 water rights would invite future litigation and unnecessarily complicate the regulation of surface and groundwater withdrawals in the Basin.

Although the year 1950 marks an important temporal line for purposes of distinguishing Compact water rights, that temporal significance fades in the face of the hydrogeologic realities of the Basin. Both pre- and post-1950 water rights draw upon the same surface water supply, and both are equally vulnerable to depletion from CBM groundwater withdrawals. Coalbed methane groundwater pumping could deplete surface waters that would otherwise pass across the hydrologic "point of measurement" and be equitably divided between the States as part of the Compact's post-1950 waters rights allocation.[97] This depletion would amount to a skimming off the "bottom" before the Compact's water accounting takes place. Further, to the extent that Wyoming is curtailing delivery of Montana's pre-1950 water rights, those senior users on the Montana side may in turn be dipping into the waters otherwise available to Montana's junior, post-1950 users. As the Special Master has already concluded, the science and law of water, including prior Supreme Court compact decisions, have evolved to treat connected waters as a jointly managed resource.[98] Thus, an integrated analysis of CBM impacts to all Compact water rights is critical to achieving an adequate remedy in the case.[99]

The Compact sends strong signals that post-1950 water rights are protected by the same prior appropriation principles that the Supreme Court and Special Master applied to pre-1950 water rights:

> Of the unused and unappropriated waters of the interstate tributaries of the Yellowstone River as of January 1, 1950, there is allocated to each signatory state such quantity of that water as shall be necessary to provide supplemental water supplies for the [pre-1950 appropriative] rights described in paragraph A of this Article V, such supplemental rights *to be acquired and enjoyed in accordance with the laws governing the acquisition and use of water under the doctrine of appropriation*, and the remainder of the unused and unappropriated water is allocated to each state for storage or direct diversions *for*

[97] *See* discussion *supra* Part I.A (discussing allocation of post-1950 waters); YELLOWSTONE RIVER COMPACT, *supra* note 7, art. V(B) (noting the points of measurement on the Tongue and Powder Rivers).

[98] *See supra* notes 56 and 57, and related discussion.

[99] The Special Master has concluded that the post-1950 rights must yield to the pre-1950 rights in the way that junior users must yield to senior users under the appropriative system. *See* First Interim Report, *supra* note 12, at 89.

> *beneficial use* on new lands or for other purposes as follows . . . .[100]

Article V(B) contemplates two categories of post-1950 water rights: (1) water rights that can be used to supplement pre-1950 water rights on existing irrigated lands; and (2) new water rights for storage, direct diversions, or other purposes on new lands, based on a percentage allocation. With respect to the first category, Article V(B) mentions the doctrine of appropriation and highlights the high priority the States placed on irrigation purposes. With respect to the second category, Article V(B) recites the classic appropriative requirement of beneficial use. Nothing in this provision suggests that the pumping of high volumes of hydrologically connected groundwater, which could injure surface water rights users, would be acceptable to the signatory States.

The parties' actions at the time of compacting further corroborate that post-1950 water uses are subject to and protected by prior appropriation principles. When Montana codified the Compact and related implementing statutes in 1953, it specifically provided that:

> All *appropriative rights to the beneficial uses* of the waters of the interstate tributaries of the Yellowstone River *acquired after January 1, 1950*, are subject to distribution in the states of Montana and Wyoming . . . as provided in subsections [B] and [C] of Article V of said compact. The purpose of this part is to provide the means to determine the various *appropriative rights to the beneficial uses of water* of the interstate tributaries of the Yellowstone River *acquired after January 1, 1950*, and the quantity of water diverted and used by each such appropriator during each year, to enable the state of Montana and the Yellowstone River Compact [C]ommission to comply with and to administer the percentage allocations as provided in subsections [B] and [C] of Article V of said compact.[101]

Wyoming adopted a similar statutory expectation, providing that "[t]he state engineer may issue his approval of an application proposing to divert compact water allocated to Wyoming if (i) [t]he *diversion and the ultimate use* of the water *are for a beneficial use of water*; and (ii) [t]he *diversion and ultimate use* of water *will not adversely affect the water rights of other persons* . . . ."[102] And as the Special Master has recognized, both States long ago extended their prior appropriation laws

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[100] YELLOWSTONE RIVER COMPACT, *supra* note 7, art. V(B) (emphasis added).

[101] MONT. CODE ANN. § 85-20-102 (Westlaw 2011) (enacted 1953) (emphasis added).

[102] WYO. STAT. ANN. § 41-12-607(b)(i),(ii) (Westlaw 2011) (enacted 1957) (emphasis added); *see id.* § 41-12-605(a)(i),(ii) (using nearly identical language in describing required contents of application for approval).

to groundwater,[103] lending further credence to the conclusion that the Compact's appropriation principles must govern and limit CBM groundwater withdrawals.

Further relevant are the Compact's exceptions for single-household domestic uses and stockwater reservoirs not exceeding 20 acre-feet in capacity.[104] These narrow categories are the only uses that the States agreed could occur outside of the Compact's division of waters under Article V(B). Such de minimis uses are strikingly different from CBM development, which pumps billions of gallons of water annually.

Likewise, the Compact's repeated emphasis on "the great importance of water for irrigation" and the Commission's authority to recommend water reallocations for irrigable lands signals an overriding intent to safeguard this type of beneficial use.[105] Although the legislatures of Wyoming and Montana have subsequently adopted public policies to promote CBM development,[106] those state-level policies cannot trump the multilateral, congressionally codified policies of the Compact.[107] The parties in 1950 signaled a clear intent that future uses of Basin waters would be beneficially applied and not pumped out of priority and then wasted to the detriment of irrigators, livestock producers, and others seeking to eke out a living in the arid lands of the Basin. The Special Master's observations about pre-1950 water rights are thus equally apropos for post-1950 water rights:

> Given the purposes of the Compact, "neither the parties to the Compact, nor the Congress and the President who approved it, could have intended that an upstream State could, with impunity, unilaterally enlarge its allocation by taking some of the virgin water supply before it reached the stream flow."[108]

Finally, the parties stated that they intended an "equitable division

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[103] *See supra* notes 58 and 59, and related discussion.

[104] *See* YELLOWSTONE RIVER COMPACT, *supra* note 7, arts. V(E)(1), II(I).

[105] *Id.* pmbl. & art. V(F). As noted, Article V(B) also creates a hierarchy that places supplemental irrigation rights first.

[106] The Montana Legislature has even gone so far as to classify CBM development as a "compelling state interest." MONT. CODE ANN. § 82-11-173 (Westlaw 2011).

[107] Interestingly, there is an additional question as to whether Montana's current CBM regulations contravene the Montana Constitution's requirement that "[t]he legislature shall . . . enact laws and provide appropriations to protect, enhance, and develop all agriculture." MONT. CONST. art. XII, § 1(1). Or the Montana Constitution's requirement that state waters be treated as a public trust and allocated according to prior appropriation principles. MONT. CONST. art. IX, § 3.

[108] First Interim Report, *supra* note 12, at 53 (citing First Report of the Special Master, Kansas v. Nebraska, No. 126, Orig., at 21 (Jan. 28, 2000)).

and apportionment" of the Basin's waters.[109] Although equitable apportionment is a doctrine that typically applies to interstate water disputes in the absence of a compact, in this case the parties expressly incorporated similar principles into the Compact.[110] They first stated that they intended the division of waters to be "equitable,"[111] and later went so far as to give the Compact Commission the powers to recommend modifications to the percentage allocations for post-1950 waters to ensure the divisions are "fair, just, and equitable."[112] Thus, the parties intended to follow notions of equity and fairness that echo the principles of the equitable apportionment doctrine.

The Supreme Court describes the equitable apportionment doctrine as seeking a "just and equitable" allocation of water under which a "delicate adjustment of interests . . . must be made."[113] It has noted in prior interstate water disputes that states "have an affirmative duty under the doctrine of equitable apportionment to take reasonable steps to conserve and even to augment the natural resources within their borders for the benefit of other States."[114] Because the parties entering into the Compact used remarkably similar wording to that of the Supreme Court, the evidence suggests that they too were seeking to delicately balance the interests of the States. Some three decades after the parties agreed to this equity, the States have introduced a new use that throws the system out of balance. It is impossible to conceive of a way that the Compact can fairly divide post-1950 waters without factoring in the millions of gallons of groundwater pumped each day that are likely contributing to the loss of surface waters in the Basin.[115] The parties' inability to right the balance on their own leaves the matter best resolved by the U.S. Supreme Court, working through its Special Master.

It is important to view these various statements of the parties' intent

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[109] *See* YELLOWSTONE RIVER COMPACT, *supra* note 7, pmbl.

[110] Equitable apportionment is a doctrine that has evolved through Supreme Court jurisprudence involving interstate water disputes. Colorado v. New Mexico, 459 U.S. 176, 183 (1982). Under this doctrine the Court considers a variety of factors, including: "physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, [and] the damage to upstream areas as compared to the benefits to downstream areas if a limitation is imposed on the former." *Id*. (quoting Nebraska v. Wyoming, 325 U.S. 589, 618 (1945)).

[111] YELLOWSTONE RIVER COMPACT, *supra* note 7, pmbl.

[112] *Id.* art. V(F).

[113] *See Colorado v. New Mexico*, 459 U.S. at 183.

[114] Idaho v. Oregon, 462 U.S. 1017, 1025 (1983) (discussing salmon).

[115] CBM PRIMER, *supra* note 1, at 15 (estimating that the average flow from a CBM well in the Powder River Basin is 12–15 gallons/minute, which roughly translates to 17,000–21,000 gallons per day per well).

as a whole and give them each effect. In a prior case involving the Yellowstone River Compact during the late 1970s and early 1980s, a federal district court first had the opportunity to interpret the Compact. The case, *Utah International Inc. v. Intake Water Co.*,[116] involved private water suppliers seeking to develop water storage, and it provided some important guidance on compact construction:

> To begin with, each article of the Compact is presumptively consistent with the body of the Compact as a whole, and is entitled to its presumptive validity and consistency until it is otherwise clearly shown. Beyond that basic tenet of statutory construction, it is further to be presumed that each article of the Compact was crafted by its drafters to serve a specific purpose; it is the obligation of this Court to give effect to that purpose.[117]

The Compact provisions described above, when viewed as a whole, demonstrate that Wyoming and Montana intended that post-1950 water uses follow the principles of prior appropriation and that a highly consumptive use such as CBM would have to be properly accounted for under those principles. Thus, the very same analysis that the Special Master applied to pre-1950 water rights holds true for the post-1950 Compact provisions. To give effect to these Compact provisions and ensure they serve their specific purposes, the *Montana v. Wyoming* litigation must address CBM's impacts on the full spectrum of water rights protected under Article V. Such an approach not only serves the purposes of the Compact, but better positions the parties to address the hydrogeologic complexities of CBM water use in an integrated manner. By including all Compact water rights in the litigation, the Special Master can then take the next step of identifying the areas where current

Wyoming and Montana CBM regulations fail to protect Compact water

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[116] Utah Int'l Inc. v. Intake Water Co. 484 F. Supp. 36 (D. Mont. 1979). The dispute in *Utah Int'l Inc.* involved two private companies fighting over which had the more senior priority date to develop water. *Id.* at 39. One company argued that it did not have to submit to Montana's appropriative rules and permitting requirements in developing water on the Wyoming side of the Yellowstone River Basin. The other argued that the first company would be using post-1950 waters allocated to Montana under the Compact and therefore was subject to Montana rules. While the district court declined to consider several issues that were already pending before a Montana state court, it did set forth the above guiding principle in determining that both states exercised shared jurisdiction over the water permit applications. *Id.* at 44–45. Five years later, one of the litigants would go back to court to litigate a separate issue under the Compact. In that case, the Ninth Circuit observed in passing that "[t]he Yellowstone River Compact fixes the water usage of *all waters* of the Yellowstone River Basin." Intake Water Co. v. Yellowstone River Compact Comm'n, 769 F.2d 568, 569 (9th Cir. 1985) (emphasis added).

[117] *Utah Int'l Inc.*, at 44–45.

rights.

### B. AN ADEQUATE REMEDY REQUIRES IDENTIFYING HOW THE STATES' CURRENT CBM REGULATIONS VIOLATE PRINCIPLES OF PRIOR APPROPRIATION

The path of CBM regulation in the West has been one marked by legislative accommodation of CBM development.[118] By and large, the CBM industry permitting process operates outside of the prior appropriation system. To the extent states subject CBM to water rights permitting review, it is a superficial form of review that fails to meaningfully analyze injury to existing water users. Wyoming and Montana are no exception, which becomes problematic when the Compact provides that the waters within the Basin must be used in accordance with appropriative principles. Using the Supreme Court's Opinion on Exception to Report of Special Master (discussed in Part I) as guidance, the Special Master can look to the appropriative laws both prior to and following the parties' entry into the Compact, along with prevailing legal scholarship,[119] to identify where CBM regulations fall short. This step is integral to the parties' remedy because, absent specific directives from the Supreme Court, the legislatures of both States are unlikely to enact the regulatory reforms necessary for Compact compliance.

The States' regulatory approach to CBM production runs afoul of several traditional concepts of prior appropriation. First, CBM groundwater pumping creates a level of waste that the West has never

[118] Legislatures, in fact, often undo judicial decisions requiring a deeper review of CBM groundwater withdrawals. As one example, the Montana Legislature disagreed with a judicial decision holding that CBM groundwater withdrawals must be reviewed for injury to senior appropriators from the initial point of withdrawal. The MDNRC had been reviewing the question of injury only if, after withdrawal, the CBM developer wanted to apply the produced water to another use. The MDNRC created a legal fiction that required review of the application as one for surface water use whose source was the pipeline into which the water had been pumped. *See infra* note 156 and related text for a discussion of the case and regulatory background. The Montana Legislature passed HB 575, which was intended to supersede the court's holding. Montana Legislature, Detailed Bill Information 2009, H.B. 575, laws.leg.mt.gov/laws09/LAW0203W$BSRV.ActionQuery?P_BLTP_BILL_TYP_CD=HB&P_BILL_NO=575&P_BILL_DFT_NO=&P_CHPT_NO=&Z_ACTION=Find&P_SBJ_DESCR=&P_SBJT_SBJ_CD=&P_LST_NM1=&P_ENTY_ID_SEQ= (last visited Mar. 12, 2012). The Governor ultimately vetoed the legislation because it "reverses longstanding principles of Western and Montana water law by allowing the issuance of a permit for the use of water associated with coal be methane ("CBM") production without providing protection to senior water rights holders." Letter from Brian Schweitzer, Governor of Montana, to Linda McCulloch, Secretary of State (Apr. 29, 2009), *available at* data.opi.mt.gov/bills/2009/AmdHtmH/hb0575govveto.HTM.

[119] *See generally supra* notes 51 and 83 (citing recent and prominent scholarship on CBM).

known or tolerated in water law. Even under new legislative machinations to categorize CBM groundwater withdrawals as a "beneficial use," there is no analysis of whether the CBM wells are operating at an efficiency level traditionally required under a water rights permit. There is also an unresolved question of whether CBM by-product water is beneficially used when it reaches the surface. The predominant model is to either discharge the water across the land or store it in evaporation ponds,[120] neither of which involves beneficial use. Second, the States are avoiding the fundamental, threshold inquiry asked of all new water users: "Will your proposed use injure existing water rights?" Instead of answering this question, CBM operators advance on a permitting fast track that bypasses all injury analysis. In keeping with the body of legal scholarship calling for reform, the Special Master should thus focus on the ways that CBM production is permitted to violate the no-waste and no-injury rules of prior appropriation.

### *i. CBM Groundwater Pumping Violates the No-Waste Rule of Prior Appropriation*

The Compact requires that the States beneficially use all waters they divert in the Basin,[121] and "[t]he principal function of the beneficial use doctrine is to prevent waste."[122] Thus, the rule against waste must be applied to CBM groundwater withdrawals that deplete the surface waters of the Tongue and Powder Rivers. As discussed in Part II above, annual CBM pumping in the Basin withdraws billions of gallons of groundwater

[120] Although CBM producers may have the option of discharging the by-product water into surface waters, this discharge requires a permit under the Clean Water Act and may have to be treated to qualify for a permit. N. Plains Res. Council v. Fidelity Exploration & Dev. Co., 325 F.3d 1155 (9th Cir. 2003). Thus, the turning back of water is typically rejected in favor of more economically expedient disposal methods such as reservoir storage. JOHN A. VEIL, U.S. DEPT. OF ENERGY, REGULATORY ISSUES AFFECTING MANAGEMENT OF PRODUCED WATER FROM COAL BED METHANE WELLS 4 (2002), *available at* www.netl.doe.gov/kmd/cds/disk2/RegulatoryIssues.pdf ("Operators are likely to select the least-cost options that are authorized by state permitting authorities."); *see also* ALL CONSULTING & MONT. BD. OF OIL & GAS CONSERV., HANDBOOK ON BEST MANAGEMENT PRACTICES AND MITIGATION STRATEGIES FOR COAL BED METHANE IN THE MONTANA PORTION OF THE POWDER RIVER BASIN 28 (Apr. 2002), *available at* fossil.energy.gov/programs/oilgas/environment/publications/BMPHandbookFinal.pdf [hereinafter BEST MANAGEMENT PRACTICES] (describing impoundments).

[121] *See* discussion *supra* Parts I.A and III.A.

[122] A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES §§ 5:67–68 (2011); *see also* 2-12 WATERS AND WATER RIGHTS § 12.02 (Robert E. Beck & Amy K. Kelley eds., 3d ed. 2010) (noting that "water must be put to [beneficial] use and not 'let run to waste'"); 94 C.J.S. *Waters* § 395 (2011) (noting that the "rule limiting the prior appropriator to the amount reasonably necessary for the purposes of the appropriation places him or her under a duty to avoid waste and use reasonable care and economy to prevent unnecessary loss in the diversion and use of the water").

that have a high likelihood of surface water connectivity.[123] The States permit this pumping without an advance review of either the wastefulness associated with the CBM wells or the subsequent wastefulness that occurs during disposal of CBM by-product water.

While the use of water is admittedly never one hundred percent efficient, there is a point at which waste becomes too great to be permitted under the law. A water user cannot command excessive amounts of water, even for an underlying beneficial use.[124] Nor can a user simply store away water or run water across the surface of the land at the expense of water rights holders who need water for beneficial use. As Justice Cardozo concluded in the Walla Walla River interstate waters dispute, "There must be no waste in arid lands of the 'treasure' of a river. The essence of the doctrine of prior appropriation is beneficial use . . . ."[125] A full century earlier, the U.S. Supreme Court held that an "appropriation does not confer such an absolute right to the body of the water diverted that the owner can allow it, after its diversion, to run to waste and prevent others from using it . . . ."[126]

The Wyoming Supreme Court echoed this sentiment in a state case on waste: "It is the diversion of more water than can be consumed in good faith . . . which creates the wasteful, non-beneficial use situation now before us."[127] The court continued by pointing out that the water user's duty includes "careful management and use, without wastage."[128] Wyoming's statutory and regulatory schemes echo these same admonitions against waste.[129]

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[123] *See supra* notes 6 and 68-77, and related discussion.

[124] A classic case on point is *Shodde v. Twin Falls Land & Water Co.*, 224 U.S. 107 (1912), wherein an Idaho irrigator unsuccessfully argued he was entitled to the flow of the Snake River beyond his actual water right to operate a water wheel apparatus that would lift water by buckets onto his elevated fields. The U.S. Supreme Court held that his water right was limited to the amount he could beneficially use, and he could not take surplus water just to operate his lift system. *Id.* at 123-26.

[125] Washington v. Oregon, 297 U.S. 517, 527 (1936) (internal citations omitted).

[126] Atchison v. Peterson, 87 U.S. 507, 514 (1874).

[127] Basin Elec. Power Coop. v. State Bd. of Control, 578 P.2d 557, 569 (Wyo. 1978).

[128] *Id.* at 573.

[129] *E.g.*, WYO. STAT. ANN. § 41-2-111 (Westlaw 2011) (authorizing the Wyoming Attorney General to bring suit to prevent the waste of waters); WYO. STAT. ANN. § 41-3-909 (Westlaw 2011) (giving the State Engineer power to prevent the waste of underground waters); WYO. STAT. ANN. § 41-3-912 (Westlaw 2011) (permitting the creation of underground control areas to address the wasting of groundwater); WYO. STAT. ANN. § 41-3-603 (Westlaw 2011) ("The water commissioner [of a water district] shall, as near as may be practicable, divide, regulate and control the use of the water of all streams, springs, lakes or other sources of water within his district as will prevent the waste of water or its use in excess of the volume to which the appropriator is lawfully entitled."); WYO. STAT. ANN. § 41-4-501 (Westlaw 2011) (requiring beneficial use and prohibiting an unpermitted diversion that is "to the detriment of others").

Montana similarly upholds the notions of beneficial use and non-waste. In the seminal decision of *Power v. Switzer*,[130] the Montana Supreme Court in 1898 held that a landowner who allowed unused water to run across an open field was not beneficially using the water and had to limit its diversion to beneficial use to prevent harm to junior users. The court held:

> [A]s the settlement of the [arid] country has advanced, the great value of the use of water has become more and more apparent. Legislation and judicial exposition have, accordingly, proceeded with increasing caution to restrict appropriations to spheres of usefulness and beneficial purposes. As a result, the law, crystallized in statutory form, is that an appropriation of a right to the use of running water flowing in the creeks must be for some useful or beneficial purpose . . . .[131]

Here too the doctrine has found its way into Montana's statutory and regulatory law,[132] including the Water Use Act's first sentence, which states, "The general welfare of the people of Montana, in view of the state's population growth and expanding economy, requires that water resources of the state be put to optimum beneficial use and not wasted."[133] Montana's definition of waste includes "the unreasonable loss of water" or "the application of water to anything but a beneficial use."[134] For several decades, Montana statutes have also provided that "no ground water may be wasted."[135]

Coalbed methane has created a gaping hole in the traditional rule against waste—a rule existing before, during, and after the creation of the Compact—that undermines the very notion of beneficial use.[136] In

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[130] Power v. Switzer, 21 Mont. 523, 55 P. 32 (1898).

[131] *Id*. at 529, 55 P. at 35.

[132] *E.g.*, MONT. CODE ANN. § 85-2-114 (Westlaw 2011) (authorizing DNRC to petition the court to prevent a person from "wasting water, using water unlawfully, [or] preventing water from moving to another person having a prior right to use the water."); MONT. CODE ANN. § 85-2-312 (1)(a) (Westlaw 2011) ("The department . . . may not issue a permit for more water . . . than can be beneficially used without waste for the purpose stated in the application.); MONT. CODE ANN. § 85-2-406 (Westlaw 2011) (allowing the district court to modify permits in the event of waste); MONT. CODE ANN. § 85-2-412 (Westlaw 2011) (requiring persons diverting surplus water "over and above what is actually and necessarily used by the prior appropriator . . . to turn and cause to flow back into the stream the surplus water."); MONT. CODE ANN. § 85-2-505 (Westlaw 2011) (prohibiting the waste of groundwater, with enumerated exemptions).

[133] MONT. CODE ANN. § 85-1-101(1) (Westlaw 2011).

[134] MONT. CODE ANN. § 85-2-102(23) (Westlaw 2011).

[135] MONT. CODE ANN. § 85-2-505 (Westlaw 2011) (prohibiting the waste of groundwater, with enumerated exemptions). This provision was adopted in 1961, codified as Rev. Code Mont. § 89-2926, when the state first enacted permitting requirements for groundwater.

[136] For a sampling of scholarship making this point, see, for example, Barrett, *supra* note 51,

2001 the Montana Legislature specifically exempted CBM groundwater withdrawals from the statutory waste prohibition.[137] CBM groundwater withdrawal is also placed entirely outside of the water rights permitting process. Instead, the Montana Board of Oil and Gas Conservation (MBOGC) exercises exclusive jurisdiction and makes no beneficial use determination.[138] The Montana Department of Natural Resources and Conservation (MDNRC) becomes involved only if a CBM producer later wants to apply the by-product water to another use.[139] Further, CBM producers are allowed to simply store the by-product water, without ever putting it to a beneficial use. This storage violates the traditional prior appropriation rule that "storage itself is not a beneficial use; storage is a means to apply water to a beneficial use."[140]

Wyoming has taken only a slightly different tack. In the absence of statutes on point, the Wyoming State Engineer has determined that CBM groundwater pumping to enable CBM production is a beneficial use requiring a permit.[141] These groundwater permits, however, are granted "as a matter of course,"[142] without any analysis of waste. And when the CBM by-product water will be discharged without further use, no permit is required for the discharge.[143] Similarly, reservoir storage of CBM produced groundwater, another popular disposal method among CBM producers,[144] is not required to be applied to a beneficial use.[145] Neither is there a beneficial use requirement for groundwater reinjected into aquifers.[146] In fact, Wyoming's regulations specifically exclude CBM by-product groundwater from being stored underground for later

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at 10681 ("The 'beneficial use' model . . . fails to account for the massive quantities of produced water that often cannot be beneficially used in the traditional sense . . . ."); Murphy, *supra* note 82, at 409 (disposing of CBM by-product water without beneficial use is wasteful); MacKinnon & Fox, *supra* note 51, at 378-84 (critiquing the lack of review of waste under Wyoming's permitting scheme).

[137] MONT. CODE ANN. § 85-2-505(1)(e) (Westlaw 2011). This exemption was passed as part of Montana Laws 2001, ch. 578, § 5.

[138] MONT. CODE ANN. § 85-2-510 (Westlaw 2011).

[139] MONT. CODE ANN. § 82-11-175(2)(a) (Westlaw 2011).

[140] LAW OF WATER RIGHTS AND RESOURCES, *supra* note 122, at § 5:37.

[141] Revised Interim Policy Memo from Patrick T. Tyrrell, *supra* note 84.

[142] WYO. STAT. ANN. § 41-3-931 (Westlaw 2011).

[143] *See generally* WYOMING STATE ENGINEER'S OFFICE, GUIDANCE: CBM/GROUND WATER PERMITS (Mar. 2004), *available at* seo.state.wy.us/PDF/GW_CBM%20Guidance.pdf; Revised Interim Policy Memo from Patrick T. Tyrrell, *supra* note 84. The process is summarized in Dennis Stickley & Lawrence J. MacDonnell, *Wyoming's Legal Framework for Management of Water Produced in Conjunction with Coal Bed Methane*, 32 WYO. LAW. 24, 25 (Oct. 2009).

[144] BEST MANAGEMENT PRACTICES, *supra* note 120, at 31.

[145] WYO. CODE REG., General Agency, Board or Commission Rules, ch. 4, § 1 (Westlaw 2011).

[146] *Id.*

beneficial use.[147] Thus, there are several methods by which CBM by-product water can be legally disposed of in Wyoming without being put to a beneficial use. Even in those rare instances when a CBM producer may choose to beneficially use the by-product water,[148] the damage and waste caused by the initial groundwater pumping has already taken place. Commentators reviewing the Wyoming permitting process have observed that more must be done to avoid waste:

> [The State Engineer's Office should be] examining and properly limiting the quantity of water produced in association with the methane gas production process and ensuring that the water so produced is, as far as possible, put to further beneficial use or made available for future use. . . .
>
> [W]e propose that the concept of beneficial use should be rigorously applied to CBM water to avoid waste of water. The SEO should take the requisite step, as was taken with surface water irrigation, and establish in effect a "duty of water" for CBM.[149]

Neither the Wyoming nor the Montana Supreme Court has ruled upon whether the CBM statutes in their respective jurisdictions comply with prior appropriation principles. In Montana, three district court decisions have signaled a possible shift. The first decision concluded that the MBOGC must consult with the MDNRC to ensure water rights are protected in the course of MBOGC's approval of CBM wells.[150] The district court cited the "anticipated impacts, whether real or imagined, of substantial dewatering of aquifers" as the justification for this consultation and the reason why CBM waste needs to be treated differently than other, more de minimis, forms of waste exempted from the State's anti-waste statute.[151] The court noted that CBM extraction "dwarfs the amounts of water" contemplated by the other statutory exemptions.[152] The court also held that *all* methods of CBM groundwater

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[147] WYO. CODE REG., Water Quality, ch. 16, app. A (Westlaw 2011). While this protection makes sense from a water quality perspective, there are negative repercussions from a water quantity perspective. Further, while reinjection into an aquifer is allowed, there is no assurance that the reinjection will be into the same aquifer or that the reinjection will in fact protect senior water rights holders in the Yellowstone River Basin. *Id.* at ch. 16, § 8(c)(ii).

[148] WYO. STAT. ANN. § 41-3-904 (Westlaw 2011).

[149] MacKinnon & Fox, *supra* note 51, at 378-84.

[150] Diamond Cross Props., LLC v. State, No. DV05-70, 2008 Mont. Dist. Lexis 180 (Mont. 22d Jud. Dist. July 14, 2008).

[151] *Id.* at *16 (citing MONT. CODE ANN. § 85-2-505(1)(e)).

[152] *Id.* Other exempt uses include withdrawing water from test wells, temporarily losing water from damaged wells that are diligently repaired, draining water off lands, removing water that is

disposal must result in beneficial use of water, which would eliminate the mere storage of by-product water.[153] Absent these steps, the court expressed concern that the CBM well permitting process could violate the Montana Constitution's requirement of beneficial use according to the principles of prior appropriation.[154]

Another Montana district court concluded that applications to use CBM by-product water must analyze the water as groundwater rather than surface water.[155] This holding would require applicants to address the groundwater's connection to surface waters and prove that there is no injury to existing water rights users.[156] And in a separate case, that same district court held that CBM evaporation ponds that are not put to beneficial use violate Montana law.[157] It remains to be seen whether these rulings will be affirmed or result in statewide changes in the law.

On the Wyoming side of the ledger, a CBM challenge did reach the Wyoming Supreme Court in a case where neighboring ranchers alleged, *inter alia*, that the State of Wyoming illegally authorized CBM groundwater pumping without considering beneficial use or waste and without providing neighboring landowners with notice and an opportunity to object.[158] Among their alleged damages, the ranchers asserted lost vegetation, soil damage, and depleted well supplies.[159] Although the court dismissed the case for lack of a justiciable controversy,[160] it issued this cautionary note:

> By ruling that the Court does not have jurisdiction over the case, we do not want to leave the impression that we approve of the State's administration of CBM water. West and Turner raise serious allegations of damages to their property from CBM water and failures on the part of the State to properly regulate CBM water statewide.[161]

The judiciary's growing discomfort with CBM regulations is clear.

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interfering with traditional mining operations, or eliminating water used in traditional mining operations. MONT. CODE ANN. § 85-2-505(1)(e) (Westlaw 2011).

[153] *Id.* at *22.

[154] *Id.* (citing MONT. CONST. art. IX, § 3).

[155] *See generally* N. Plains Res. Council, Inc. v. Montana Dep't of Natural Res. & Conservation, No. CDV-2007-425 (Mont. 1st Jud. Dist. Dec. 15, 2008), discussed *supra* note 118.

[156] MONT. CODE ANN. § 85-2-311(1) (Westlaw 2011).

[157] Tongue & Yellowstone Irrigation Dist. v. Montana Bd. of Oil and Gas Conservation, No. BDV-2003-579, 2010 Mont. Dist. Lexis 116, at *17–18 (Mont. 1st Jud. Dist. Mar. 5, 2010).

[158] William F. West Ranch, LLC v. Tyrrell, 2009 WY 62, ¶ 21, 206 P.3d 722, ¶ 21 (Wyo. 2009).

[159] *Id.* ¶ 25.

[160] *Id.* ¶ 22.

[161] *Id.* ¶ 48.

Although we see strong signals that these regulatory schemes may not withstand judicial scrutiny, we have no certainty of the timeline under which future state court rulings will issue. In the meantime, the States continue to permit vast quantities of Basin groundwaters to be withdrawn under suspect regulatory schemes that violate the no-waste rule and, when there is surface water connectivity, the Compact. The Special Master and the U.S. Supreme Court are thus uniquely situated to stop the waste of Basin waters.

### *ii. CBM Groundwater Pumping Violates the No-Injury Rule of Prior Appropriation*

Under the prior appropriation doctrine, it is axiomatic that a new water user may not take water that belongs to an existing water rights user—the "no injury" rule.[162] In his First Interim Report, the Special Master concluded that the prior appropriation doctrine has evolved to include hydrologically connected groundwater.[163] As evidence of this evolution, he noted that both Wyoming and Montana have included groundwater within their water rights permitting systems.[164] Yet when it comes to CBM production, both States' regulatory systems openly violate the no-injury rule by failing to consider whether CBM wells deplete water belonging to water rights users.[165]

While the Wyoming State Engineer has concluded that CBM groundwater pumping is a beneficial use requiring a permit, Wyoming does not review the permit applications in advance for injury. Instead, the permit is typically granted "as a matter of course,"[166] with a condition requiring no injury.[167] Wyoming groundwater permits specify:

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[162] LAW OF WATER RIGHTS AND RESOURCES, *supra* note 122, at § 5.15; 2-12 WATERS AND WATER RIGHTS, *supra* note 122, at § 17.02 ("Interference with water rights by other appropriators or would-be appropriators gives rise to statutory and common law protection for holders of senior water rights. . . . This right of protection against interference with appropriative rights has long been recognized as fundamental law by the courts and writers.").

[163] *See supra* notes 56-59 and related discussion.

[164] *See supra* notes 56-59 and related discussion.

[165] For a sampling of scholarship making this point, *see, e.g.*, Murphy, *supra* note 82, at 408 (noting concerns about impacts to water rights as "aquifers are depleted"); Valorz, *supra* note 82, at 135-36 (concluding that Wyoming's State Engineer is failing to ensure that existing water rights are protected); Eric Waeckerlin, Case Note, *The New Border War: CBM Development in the Powder River Basin of Wyoming and Montana*, 26 PUB. LAND & RESOURCES L. REV. 149, 156 (2005) (observing that irrigators and other surface water rights users are at risk from CBM production).

[166] WYO. STAT. ANN. § 41-3-931 (Westlaw 2011).

[167] Form U.W.5, Application for Permit to Appropriate Ground Water 2 (2009), *available at* seo.state.wy.us/PDF/UW5_0909.pdf.

> This application is approved subject to the condition that the proposed use shall not interfere with any existing rights to ground water from the same source of supply and is subject to regulation and correlation with surface water rights, if the ground and surface waters are interconnected.[168]

Advance notice is not required before the permit issues, so little opportunity exists for water rights users to raise issues of injury in advance.[169] The burden thus shifts to the injured water rights user to assert an injury after it has occurred.[170] The injured user may be facing major water depletions that are harming her livelihood, yet she is asked to bear the financial costs of proving that CBM production caused her injury—no small task in the hyrdologically complex Powder River Basin. For all practical purposes, Wyoming has relinquished its responsibility to protect senior water rights users from CBM production and has left those users to fend for themselves.

The picture in Montana is equally concerning. The Montana Water Use Act generally requires applicants for new groundwater uses to show, *inter alia*, that water is legally and physically available and that "the water rights of a prior appropriator under an existing water right, a certificate, a permit, or a state water reservation will not be adversely affected."[171] But CBM wells are exempted from the Water Use Act, and the MBOGC, which has jurisdiction over CBM wells, does not apply the Act's review criteria.[172] Even in those limited situations when the MDRNC reviews beneficial uses of CBM by-product water, the agency has created a legal fiction that the "source" of the water right is the above-ground pipeline in which the by-product water is stored.[173] Thus, Montana does not review the initial CBM groundwater extraction for injury to either surface or groundwater rights users.

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[168] *Id.*

[169] This lack of notice was one basis of the litigation in *William F. West Ranch, LLC v. Tyrrell*, 206 P.3d 722 (Wyo. 2009). *See* discussion *supra* notes 158-161 and accompanying text.

[170] Establishing an injury does not guarantee that an adequate remedy will result. As noted above in Part II, the damage to the water resource may appear long after the CBM well has been capped and the producer has moved on.

[171] MONT. CODE ANN. § 85-2-311(1)(a), (b) (Westlaw 2011).

[172] *See supra* notes 138-139 and accompanying text.

[173] Order on Scope of Issues for Hearing, Application Nos. 42B-30011045 and 42B-30014358 for Beneficial Water Use Permit by Fidelity Exploration 2–3 (Jan. 3, 2007), *available at* www.dnrc.mt.gov/wrd/water_rts/hearing_info/significant_hearingdecisions/fidelity_order-hearingexaminer.pdf. One district court has held that this legal fiction is legally and factually incorrect, and that MDNRC should review applications for use of CBM by-product water as groundwater applications and also then analyze injury to users due to that groundwater withdrawal. N. Plains Res. Council, Inc. v. Montana Dep't of Natural Res. & Conservation, No. CDV-2007-425 (Mont. 1st Jud. Dist. Dec. 15, 2008) (on file with author).

As is the case in Wyoming, injured water rights users in Montana are also left to fend for themselves. At first blush, Montana does appear to provide limited protection by statutorily requiring CBM producers to "offer" water mitigation agreements to injured well owners within a "circle of influence" (COI) area around a CBM well.[174] But the balance of power seems greatly tilted toward the CBM producer to determine both whether there is an injury and what mitigation is appropriate. And, turning the no-injury rule on its head, the statute suggests that the CBM producer ultimately gets to take the senior water user's groundwater in exchange for some unspecified form of "mitigation."[175] This is tantamount to permitting a CBM company to condemn a water right without going through eminent domain procedures or paying just compensation. Injured surface water users—those who would be protected under the Compact—are left to their own devices since the CBM laws fail to even consider them at all.

Scientists have questioned the "circle of influence" approach to injury because it does not reflect the hydrologic reality of Basin-wide CBM groundwater drawdowns.[176] In commenting on the proposed use of COI mitigation in the Basin, one senior geologist observed the following:

> [G]roundwater models indicate that the drawdown caused by CBM development is regional in nature. In other words, the CBM development causes drawdown that extends across the basin—the entire Powder River Basin becomes one gigantic gas field. The groundwater models indicate that the drawdown is tied collectively to the entire development. However, damage to a water well, as defined by the water well agreement, is tied to the well within the circle of influence of a CBM well (or wells) . . . . There will be places in the

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[174] MONT. CODE ANN. § 82-11-175(3) (Westlaw 2011); *see also* WATER RESOURCES DIVISION, MONTANA DNRC, MONTANA'S BASIN CLOSURES AND CONTROLLED GROUNDWATER AREAS 23–24 (Dec. 2003), *available at* dnrc.mt.gov/wrd/water_rts/appro_info/basinclose-cgw_areas.pdf (requiring similar mitigation within a controlled groundwater area in the Powder River Basin).

[175] MONT. CODE ANN. § 82-11-175(3) (Westlaw 2011).

[176] For example, Wyoming geologist Walter Merschat was quoted in *Powder River Breaks* as follows:

> Merschat also dismissed the use of a "circle of influence" around a well to artificially limit the area in which a well is believed to affect groundwater supply. "It is unfortunate that the COI has been adopted to define the limits that CBM dewatering activities impact groundwater," he wrote. "Groundwater flows downhill through subsurface reservoirs and its movement is based on rock fabric, not a circle on the surface. Therefore, the aerial extent of CBM dewatering is more widespread and complex than a simple circle on a map."

*Experts Cite CBM Threats in Fortification Area*, 35 POWDER RIVER BREAKS, July-Aug. 2007, at 3, *available at* www.powderriverbasin.org/assets/Uploads/files/publications/2007/breaksjulyaug07.pdf.

> CBM developed portion of the Powder River Basin where there is no operating CBM well within [the COI], yet where the groundwater models predict a decline in the Fort Union water level of more than several hundred feet. In other words, there may be no active CBM well within [the COI] of an impacted water well; the impact is caused by the collective CBM development.[177]

It is difficult to imagine a scenario where Basin-wide aquifer drawdowns of several hundred feet *do not* impact both surface and groundwater users in the Tongue and Power River basins. This high likelihood of injury makes the need for advance review of injury all the greater.

In summary, the States have created an extraordinary exemption for CBM development that undermines the very tenets of prior appropriation law as we know it. They are permitting CBM wells without advance review of groundwater-surface water connectivity, without advance review of waste, and without advance review of injury to water rights users. CBM producers in Wyoming and Montana may well be drawing down surface water supplies belonging to both pre- and post-1950 water rights holders in violation of the Compact. By identifying those CBM regulations that offend the Compact, the U.S. Supreme Court and the Special Master can provide clear guidance to the States' and help set the stage for a better CBM management regime—a regime that could serve as a guide for other western states as well. The key scientific components of that CBM management regime, which are a necessary part of any remedy in the *Montana v. Wyoming* litigation, are described next.

### C. AN ADEQUATE REMEDY MUST INCLUDE DECISIONMAKING AND MANAGEMENT BASED ON SOUND GROUNDWATER SCIENCE

In the final step toward Compact compliance, the U.S. Supreme Court and the Special Master should identify the basic scientific requirements necessary to ensure the States honor the Compact's equitable division of waters during their development of CBM. At this point, it is tempting to consider the possibility that the States may, through settlement talks, be able to resolve the scientific approaches they wish to take. Nonetheless, we must remain mindful that it was the parties' inability to resolve their differences that resulted in the

[177] Comments on Wyoming & Montana Final Environmental Impact Statement on the development of Coal-Bed Methane at 7 (undated), submitted by John Bredehoeft, Ph.D. [hereinafter Bredehoeft Final EIS Comments], a*vailable at* www.powderriverbasin.org/assets/Uploads/files/final/expertfeisjohnbredehoeft.pdf.

proceeding being filed before the U.S. Supreme Court.[178] Moreover, the economic incentives are skewed in such a way that the States may forestall addressing CBM issues in favor of allowing the economic benefits of CBM development to continue. Although the parties may eventually be in a position to negotiate the finer points of a CBM management program, the Special Master can provide an important starting place for negotiations by stating the essential scientific requirements that a CBM management program must contain for purposes of Compact compliance. In so doing, the Special Master will also be benefitting the other western states that share interstate CBM basins as well.

Briefly, the essential scientific requirements for Compact compliance should include:

> Reliable surface-groundwater modeling and data collection that is shared and stored in databases accessible to both parties;
> A scientific threshold for determining when surface and groundwater are considered "connected";
> Advance analysis of injury, using science-based data, before a CBM well is permitted;
> Consideration of cumulative impacts and longevity of impacts when considering injury during CBM well permitting;
> Mitigation that protects the quantity, quality, and timing of water use to which water rights holders are entitled under the Compact; and
> Ongoing monitoring and active management of waters impacted by CBM groundwater pumping.

If these basic scientific requirements are stated as an essential component of the remedy in *Montana v. Wyoming*, then the parties will be responsible for resolving how to implement the requirements over the long term. What follows is a brief rationale for why these scientific requirements are necessary, as well as some possible directions that the parties could take in their implementation.

*Surface-Groundwater Modeling and Data Collection*. Leshy describes groundwater modeling as "an essential tool to manage groundwater intelligently."[179] Indeed, any fair and equitable remedy must emanate from a body of accurate scientific models and data concerning groundwater-surface water connectivity in the Basin, beginning with the areas where CBM development is occurring most heavily and moving into other areas of anticipated CBM groundwater

[178] Brief in Support of Motion, *supra* note 15, at 2, 26–27.
[179] Leshy, *supra* note 67, at 1479.

use.

The National Research Council (NRC) recently concluded that to meaningfully evaluate various management options for CBM groundwater withdrawals, "data to determine the connectivity of groundwater and surface water and groundwater modeling are necessary."[180] The NRC goes on to note that data gaps exist in the Powder River Basin and that existing data is not compiled into common, accessible databases. The NRC observes that this data is critical to testing the results of groundwater modeling "to establish a level of reliability that is suitable for making management decisions."[181] Absent field data, hydrogeologic models may yield inaccurate results that fail to account for "complex water-rock interactions, differences in hydraulic properties, or boundary conditions in CBM basins."[182]

The concept of groundwater modeling and data collection is not new in compact administration. In a Final Settlement Stipulation among Colorado, Nebraska, and Kansas, those states agreed to settle a dispute under the Republican River Compact by identifying specific accounting practices, reporting practices, data sharing, and groundwater modeling protocols that would address groundwater depletions of surface water on the Republican River.[183] Additionally, Lawrence MacDonnell, in writing on the feasibility of greater surface-groundwater regulation in Wyoming, notes several other successful examples of groundwater modeling in the West—modeling that ultimately helps "promote the most effective use of the available water supply."[184] Colorado in particular has made strides by designating key CBM study areas where it is determining whether CBM groundwater pumping is depleting surface water supplies.[185]

Further, although the Yellowstone River Compact does not address federal or Indian reserved water rights, the Basin contains large

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[180] COALBED METHANE PRODUCED WATER, *supra* note 1, at 47.

[181] *Id.* at 7, 49.

[182] *Id.*

[183] Final Settlement Stipulation, Kansas v. Nebraska (No. 126, Orig.) (Dec. 15, 2002)), *available at* www.ksda.gov/includes/document_center/interstate_water_issues/RRC_Docs/RR_Settlement_Stipulation176.pdf. It should be noted that Kansas has sued Nebraska for violating this Stipulation based on the data revealed by the accounting reported under the groundwater modeling since the parties entered into the Stipulation. *See generally* Kansas Motion for Leave to File Petition, Petition, and Brief in Support (No. 126, Orig.) (May 3, 2010), *available at* www.pierceatwood.com/files/9389_2010-05-03_KansasMotionforLeavetoFilePetitionPetitionandBriefinSupport.pdf.

[184] *See* MacDonnell, *supra* note 67, at 62 (citing examples from Colorado, Idaho, Washington, and Arizona).

[185] *See* Colorado Geological Survey, Water Depletion as a Result of Coalbed Methane Production in Colorado, geosurvey.state.co.us/water/CBM%20Water%20Depletion/Pages/CBMWaterDepletion.aspx (last visited Mar. 12, 2012).

landholdings belonging to the federal government and the Crow Tribe and Northern Cheyenne Tribe.[186] The Environmental Impact Statements for CBM development on federal lands already demonstrate the federal government's use of groundwater modeling to assess impacts of CBM development on federal lands.[187] Because CBM and water resources cross through these jurisdictional boundaries, the federal government and Tribes appear to be essential partners in this modeling and data gathering endeavor.

*Thresholds for Determining Connectivity*. To properly analyze impacts to Compact water rights users, it is important to quantitatively establish the "extent to which CBM-producing formations hydraulically connect to surface waters and major aquifers."[188] The scientific community generally recognizes the principle that all groundwater, at some point, connects to surface water.[189] Thus, the States must identify the point at which connectivity transitions from remote to significant enough to measurably impact surface water rights.

Here, the parties have an example in the settlement reached among Wyoming, Nebraska, and Colorado resolving a surface water-groundwater dispute under the North Platte Compact.[190] In that case, the parties stipulated that "[a] hydrologically connected groundwater well is one that is so located and constructed that if water were intentionally withdrawn by the well continuously for 40 years, the cumulative stream depletion would be greater than or equal to 28% of the total groundwater withdrawn by the well."[191] Colorado state law provides another alternative. There, groundwater is presumed to be "tributary" to surface water unless the applicant for groundwater use proves that the withdrawal will not "within one hundred years of continuous withdrawal, deplete the flow of a natural stream . . . at an annual rate greater than

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[186] *See* T.T. TABER & S.A. KINNEY, LAND USE AND OWNERSHIP, POWDER RIVER BASIN, U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1625-A, at figs. PM-2 and PM-3 (1999), *available at* pubs.usgs.gov/pp/p1625a/Chapters/PM.pdf (assessing tertiary coal beds and zones by surface and underlying ownership).

[187] See, for example, the Wyoming and Montana EIS documents for the Powder River Basin, *supra* notes 79-80.

[188] COALBED METHANE PRODUCED WATER, *supra* note 1, at 48.

[189] *E.g.*, THOMAS C. WINTER ET AL., U.S. DEPT. OF INTERIOR, U.S. GEOLOGICAL SURVEY, GROUND WATER AND SURFACE WATER: A SINGLE RESOURCE 1 (1998), *available at* pubs.usgs.gov/circ/circ1139/pdf/circ1139.pdf; MacDonnell, *supra* note 67, at 62.

[190] *E.g.,* Nebraska v. Wyoming, 534 U.S. 40 (2001) (settling a dispute involving groundwater depletions under the North Platte Compact) (discussed in MacDonnell, *supra* note 67, at 58–60).

[191] Proposed Joint Settlement at 201, *Nebraska v. Wyoming*, 534 U.S. 40 (No. 108, Orig.), *available at* dnr.ne.gov/NorthPlatte/Settlement/108FinalReport.pdf (discussed in MacDonnell, *supra* note 67, at 58–60).

one-tenth of one percent of the annual rate of withdrawal."[192]

*Advance Analysis of Injury*. Consistent with prior appropriation principles, a CBM developer must provide an advance analysis of injury to water rights users before any CBM well permit is issued. Wyoming's lack of advance analysis of harm under its CBM groundwater permits provides an inadequate remedy because the ensuing harm may be long-term or irreversible once it occurs.[193] Likewise, "circle of influence" approaches such as those taken by Montana are inadequate because they do not comport with groundwater science and fail to address surface water injuries.[194] Thus, an entirely new approach to injury analysis is warranted—one that uses groundwater modeling and data in advance to determine the extent of injury to existing water rights holders under the Compact.

Outside of CBM water use, Montana already inquires into the harm posed by other groundwater permit applicants and, further still, requires more extensive groundwater modeling (hyrdogeologic assessments) for groundwater permit applications in its closed, or over-appropriated, basins.[195] And while not perfect models, the regulatory approaches taken by the Canadian provinces of Alberta and British Columbia also demonstrate that it is possible to ask CBM developers in advance for water quality and water quantity data that is then used in determining the impacts posed by the CBM groundwater withdrawals.[196]

To the extent that a State lacks the necessary data to determine injury to other water users, then the path of the Hawaii Supreme Court, which has imposed the precautionary principle during water permitting, provides an appropriate analog. When Hawaii's state water commission lacked sufficient evidence to determine whether water rights applicants

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[192] COLO. REV. STAT. ANN. § 37-90-103(10.5) (Westlaw 2011). A recent Colorado decision has now held that CBM groundwater withdrawals are beneficial uses subject to this requirement. *See Vance v. Wolfe*, 205 P.3d 1165, 1171 (Colo. 2009).

[193] *See* discussion *supra* Parts II and III.B.

[194] *See* discussion *supra* Part III.B.

[195] MONT. CODE ANN. § 85-2-311 and -360 to -363 (Westlaw 2011).

[196] ALBERTA ENVIRONMENT, GUIDELINES FOR GROUNDWATER DIVERSION FOR COALBED METHANE/NATURAL GAS IN COAL DEVELOPMENT 5–6 (Apr. 2004), *available at* environment.gov.ab.ca/info/library/7834.pdf [hereinafter ALBERTA GUIDELINES]; BRITISH COLUMBIA, CODE OF PRACTICE FOR THE DISCHARGE OF PRODUCED WATER FROM COALBED GAS OPERATIONS, B.C. Reg. 156/2005, § 11 (2005), *available at* www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/17_156_2005. Both models are discussed in Allan Ingelson et al., *CBM Produced Water—The Emerging Canadian Regulatory Framework*, 10 U. DENV. WATER L. REV. 23, 31–32, 37–38 (2006). These models are imperfect because, among other issues, both focus mostly on water quality and groundwater impacts and underemphasize the impacts on water quantity and hydrologically connected surface waters. Further, neither model assures protection of existing water uses. Nonetheless, the proactive review built into both models demonstrates the feasibility of advance review of injury.

could use water without causing public harm, the Hawaii Supreme Court held that it was appropriate for the commission to order the applicants to contribute to the costs of stream studies and monitoring before determining whether the permit criteria were satisfied:

> Where scientific evidence is preliminary and not yet conclusive . . . it is prudent to adopt "precautionary principles" in protecting the resource. That is, where there are present or potential threats of serious damage, lack of full scientific certainty should not be a basis for postponing effective measures to prevent environmental degradation . . . . In addition, where uncertainty exists, a trustee's duty to protect the resource mitigates in favor of choosing presumptions that also protect the resource.
>
> As with any general principle, its meaning must vary according to the situation and can only develop over time. In this case, we believe the Commission describes the principle in its quintessential form: at minimum, the absence of firm scientific proof should not tie the Commission's hands in adopting reasonable measures designed to further the public interest.[197]

Because of the potential for long-term and irreversible harm from CBM groundwater pumping, it similarly makes sense to employ the precautionary principle and impose study requirements on CBM well applicants to ensure that no actual injury occurs to water rights users under the Compact.

*Determining Cumulative Impacts and Longevity of Impacts*. Injury should not be analyzed on a well-by-well basis, but rather with an eye toward the cumulative impacts of multiple CBM wells pumping across a groundwater source. In his CBM Primer, Gary Bryner notes that "[t]he minimum threshold for a viable [CBM] project . . . depends on a variety of factors, but one estimate is that a new, remote basin requires at least 400 wells or 200 billion cubic feet of production to be viable."[198] Basin geologist Joe Bredehoeft, citing to existing Basin groundwater models, has observed that the cumulative effect of these multiple wells "causes drawdown that extends across the basin—the entire Powder River Basin becomes one gigantic gas field" that can draw down an aquifer by as much as 100 feet.[199] Thus, the States should not artificially limit their analysis to individual CBM wells when reviewing for injury to water rights users under the Compact. Here too, the Province of Alberta

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[197] *In re* Water Use Permit Applications (*Waiahole*), 9 P.3d 409, 426-27, 495-96 (Haw. 2000).
[198] CBM PRIMER, *supra* note 1, at 7.
[199] Bredehoeft Final EIS Comments, *supra* note 177, at 7.

provides an example of a jurisdiction that considers cumulative impacts as part of the initial CBM permitting process.[200]

Further, as discussed in Part II above, the true impact of the CBM wells must be viewed over the long term, since the wells themselves have a very short life span.[201] The rates of aquifer recharge will be significantly slower than the rates of CBM groundwater pumping—extending into the hundreds of years. Impacts will most likely continue long after a CBM well is abandoned,[202] and that long-term harm must be factored into the States' review of injury.

*Suitability Thresholds for Mitigation.* The reality is that CBM development will continue into the foreseeable future because of its significance to national energy production and because of the economic benefits that return back to the States.[203] This means that, to the extent CBM development is depleting Basin waters, the States will have to find new and creative ways to ensure water delivery to Compact water users while also allowing CBM development to occur. The creative use of storage, recharge, substitution and other types of replacement water mitigation is likely necessary to achieve Compact compliance. Indeed, because much of the CBM water in the Basin is of higher quality, it may serve useful in mitigation,[204] provided that senior water rights holders do not suffer injury during the mitigation process. The States' present mitigation systems, discussed in Part III.B above, will not adequately protect Compact water users because they leave mitigation to the discretion of the CBM company. True mitigation must include questions not only of replacement quantity but also of replacement quality,[205] as

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[200] ALBERTA GUIDELINES, *supra* note 162, at 8.

[201] *See* discussion *supra* Part II; *see also* CBM PRIMER, *supra* note 1, at 7 (noting that wells typically produce gas for seven to ten years, and "basins may be relatively quickly pumped and then abandoned").

[202] CBM PRIMER, *supra* note 1, at 7; *see also* discussion *supra* Part II.

[203] *See, e.g.*, Rod De Bruin, *Wyoming Oil and Gas*, WYOMING STATE GEOLOGICAL SURVEY, www.wsgs.uwyo.edu/AboutWSGS/oil_and_gas.aspx (last visited Mar. 12, 2012) ("In fiscal year 2006, oil and gas production contributed more than $2.2 billion to state and local governments in severance and property taxes, federal and state royalties, conservation mill levy, and sales and use taxes."); *see also* DE BRUIN ET AL., *supra* note 76, at 20–21 (generally outlining the economic benefits to government and private businesses and landowners); CBM PRIMER, *supra* note 1, at 1 (noting CBM as a central resource to the security of our national energy supply).

[204] CBM PRIMER, *supra* note 1, at 13 fig.9.

[205] Under prior appropriation, a water right included not only quantity, but also quality sufficient to support the water use. City of Helena v. Rogan, 26 Mont. 452, 470, 68 P. 798, 800 (1902) (recognizing that a water rights holder has the right to have water of "such quality as will meet his needs as protected by his water right"); *see also* Sussex Land & Live Stock Co. v. Midwest Refining Co., 294 F. 597, 603 (1923) (under the Wyoming Constitution, a water right includes "the quality as well as the quantity" (quoting Arizona Copper Co. v. Gillespie, 230 U.S. 46, 57 (1913)). While this Article has necessarily focused on quantity due to the nature of the claims in *Montana v.*

well as the timeliness and convenience of water delivery. These are questions that the States, rather than CBM developers, should resolve in advance of permitting a CBM well, so that the water users protected by the Compact are not left in a worse position than they were in prior to approval of a CBM well.

*Monitoring and Active Water Area Management*. Data-gathering for CBM well analysis should extend beyond the permitting stage to ongoing monitoring of the wells in the field. Ongoing monitoring ensures the injury does not grow beyond that predicted during the initial review of the CBM well application. This ongoing data gathering also further fills the Basin's data gaps, continuing to improve the accuracy of the groundwater modeling on which the parties will rely. Here, Basin geologist John Bredehoeft recommends that:

> There should be a monitoring program designed to document the impact of CBM production on the deep aquifers of the Powder River Basin. If we are to see the total impact of the development (drawdown and recovery) the monitoring needs to be sustained into the later part of the 21st Century—at least to the year 2060. There will be pressure to discontinue the monitoring once the CBM wells are plugged and abandoned and the CBM operators are gone.[206]

Bredehoeft goes on to suggest that the monitoring include: sufficient monitoring wells appropriately located to obtain an accurate picture of drawdown in the Basin; a select number of "continuous monitoring" stations that generate "digital data collected at 15-minute intervals"; and a records database "that is kept up to date and accessible on the Internet."[207]

This monitoring is best achieved within the context of actively managed water areas that geographically encompass the places that CBM groundwater withdrawals are impacting Compact rights. Both States currently have statutes that could be adapted for such use. In Wyoming, the State has authority to create "control areas" when there is insufficient water to meet the needs of appropriators, when conflicts in use are occurring, or when there is waste of water.[208] Within these areas, wells are closely monitored for harm to other users, withdrawals may be curtailed or reduced, rotations in use may be imposed, and wells may be

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*Wyoming*, the remedy would be wholly inadequate if CBM developers could mitigate harm by supplying substitute waters of inferior quality that could not support the irrigation, livestock, and domestic uses of the Basin.

[206] Bredehoeft Final EIS Comments, *supra* note 177, at 9.

[207] *Id.* at 10.

[208] WYO. STAT. ANN. § 41-3-912 (Westlaw 2011).

spaced to reduce harm.[209] A similar approach may be taken in areas of demonstrated groundwater-surface water connectivity when unified administration of rights by priority becomes important.[210]

In Montana, "controlled ground water areas" may be created for similar reasons, and the State possesses comparable authority to close or restrict withdrawals, regulate well spacing, and require mitigation in the event of harm to users.[211] In Montana's closed basins, where water supply is over-appropriated, the State requires that proposed groundwater withdrawals conduct a hydrogeologic assessment that analyzes surface water impacts.[212] Where a "net depletion of surface water" will occur and cause an adverse impact to an appropriator, the law imposes a mitigation requirement that precludes new water uses unless and until suitable replacement waters can be found.[213] The mitigation may be through aquifer recharge or replacement surface or groundwaters via the reallocation of existing water rights.[214]

At the moment, neither State appears to be using these statutory mechanisms to squarely tackle the issue of CBM groundwater depletion of senior surface water rights. By articulating a starting place for integrated surface and groundwater management in the Basin,[215] and informing it with the scientific measures discussed above, the Special Master can set Wyoming and Montana on a course that reduces the chances of further interstate disputes in the Basin and provides a meaningful, prospective remedy under the Compact.

## V. CONCLUSION

*Montana v. Wyoming* offers a rich and rare opportunity to transform the relationship between CBM and prior appropriation. The Special Master has concluded that hydrologically connected groundwaters fall within the scope of the Yellowstone River Compact, and the U.S.

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[209] *Id.* § 41-3-915.

[210] *Id.* § 41-3-916.

[211] MONT. CODE ANN. § 85-2-506 (Westlaw 2011). Montana currently has such an area designated in part of the Powder River Basin, but controls are limited to remedying harm to groundwater well owners within a circle of influence around a CBM well—essentially paralleling the statutory remedy critiqued in Part III.B, *supra*. These controls are inadequate to address the full spectrum of senior rights requiring protection.

[212] MONT. CODE ANN. §§ 85-2-360, -361 (Westlaw 2011).

[213] *Id.*

[214] *Id.* § 85-2-362.

[215] "Integrated" suggests an approach where surface and groundwaters are managed as one resource to ensure that water is used according to priority. This does not necessarily mean that the States will jointly co-manage those waters, although each State will need to manage its water resources under the Compact according to certain mutually agreed upon practices and rules.

Supreme Court has held that the laws of prior appropriation imbue the parties' expectations under the Compact. Based on these preliminary rulings, the country's highest court is poised to illuminate the water law rules applicable to CBM groundwater withdrawals and to fashion a remedy that better hews to those rules. Important to that remedy will be the inclusion of all Compact water rights, a candid critique of the States' current CBM regulations, and a call for certain basic steps that assure sound management practices of the surface and groundwaters affected by CBM production. With states throughout the West struggling with these very same issues, and seemingly unable to reach solutions on their own, the opportunity to improve CBM regulation starts but does not end with the Powder River Basin.